

# Master Programme in Innovation and Technological Entrepreneurship

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*Can we model the entrepreneurial opportunity using both discovery and creation  
theory?*

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## **Abstract**

The field of entrepreneurship research has grown considerably since “The Promise of Entrepreneurship as a Field of Research” was first published by Shane and Venkataraman (2000). A key construct which has been at the heart of this growth, in publications and theoretical development, has been the concept of “entrepreneurial opportunity”.

However, entrepreneurship research has a plethora of diverging concepts pertaining to the entrepreneurial opportunity and two predominant views on this concept exist. The Creation Theory, which believes opportunities are created and the sole outcome of entrepreneurial action. And, the Discovery Theory, which believes opportunities exist without the entrepreneur and are simply discovered by him/her. These views, opposing as they may seem, have garnered much attention from researchers and new concepts have risen which can answer to both creation and discovery theories, sometimes making both views compatible.

This work is focused on creating a model for entrepreneurial opportunities which can explain the opportunity development process and foster a new concept of entrepreneurial opportunity, compatible with both views. A focus was made to make previous knowledge, distinct definitions and concepts integrated into the model to build an integrative approach and to ground the model in previous developments.

The proposed model describes the opportunity development process, and, on the other hand, what are the outputs of this process in a Front-End of Innovation context. It can be used as an initial approach for empirical studies and further validation in the field of entrepreneurial opportunity, a need greatly felt by researchers and academics alike.

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## **1. Introduction**

In the field of entrepreneurship, few concepts have raised such diverging opinions, theories and attempts to clarify as the concept of opportunity. In this sense, the entrepreneurial opportunity construct was given more attention due to the work of Shane and Venkataraman (2002).

Before addressing the field of entrepreneurship research and, more specifically, the concept of entrepreneurial opportunity (as well as other concepts in proximity), it makes sense to clarify the interest, motivation and objectives which propel this dissertation.

Regarding the motivation for the study of the concept of “entrepreneurial opportunity” and modelling this reality as well as related phenomena, it is two-fold. Firstly, it is one of the key concepts in the field of entrepreneurship and, consequently, it is a highly controversial construct, not only since there seems to be a difficulty in achieving consensus on what role does the opportunity play in the so-called entrepreneurship (or individual-opportunity) nexus (Davidsson, 2015). Similarly, there seems to be a lack of consensus on what are the relevant characteristics which allow us to clearly define what is, and isn’t, an “entrepreneurial opportunity”. Secondly, the “opportunity” construct is at the basis of entrepreneurial action if entrepreneurship can be framed as a nexus between “the presence of lucrative opportunities and the presence of enterprising individuals” (Shane and Venkataraman, 2000, p.218), it can be clearly pointed-out how unavoidable the concept is.

Due to the opportunity construct’s importance and unavoidability, a model to explain the phenomenon can add to the knowledge base of entrepreneurship research. Additionally, to validate this model with professionals related to this area and to even apply the model to scenarios could complement the created model on the “entrepreneurial opportunity” construct.

Considering this motivation, the present dissertation has a set of objectives to focus its study and make it approachable, these being:

- Create a model to explain the concept of opportunity and the main phenomena, agents and conditions which surround the concept, based on different viewpoints;
- Include in this model the entrepreneurship nexus, the relation between two main constructs, the entrepreneur and the opportunity;

- Create a definition for the concept of opportunity which can attempt to solve the main issues previous attempts have failed to do;
- Understand more about the opportunity recognition (and evaluation) process;
- Support the model and its components with existing literature, establishing a connection between previous research, so the model can achieve substance;
- Extend the current body of research for the concept of “entrepreneurial opportunity” and lay foundation for future validation and modelling of the concept;

The developed model will attempt to answer these questions and provide a baseline approach for an opportunity construct which can make opposing views in Literature both compatible and complementary.

The applicability of the model was also tested in two ways, on one hand there were interviews with faculty personnel and an entrepreneur in order to validate and reshape the model, especially in the areas of greater proximity to their knowledge, and on the other hand, there was the development of two instances of the model, for an entrepreneurial business (Uniplaces) and for a traditional company’s innovation process (P&G’s Swifter) in order to see if the model can accurately explain the process of opportunity recognition and all of the factors relevant to the entrepreneurial opportunity.

The structure of this dissertation will be the following.

1. the second chapter of this dissertation will be devoted to analyzing the previous body of work in the field of entrepreneurship research and the current state of the opportunity construct, as well as the opportunity recognition process while identifying knowledge gaps to which this work can respond to.
2. The third chapter will be focused on delving deeper into the methodology which is used to construct and validate our model.
3. The fourth chapter will be focused on the proposed model for the opportunity construct and the opportunity recognition process, the concepts it tackles as well as the exposure of previous literature to support the model’s building blocks
4. The fifth chapter of this work will be focused on the validation and iterative process of the model, what were the main outputs of the interviews and a presentation of the instances developed within our model, so the reader can evaluate the present work with all the relevant information.
5. Lastly, there will be a chapter devoted to conclusions and for future research questions and comments which have risen from this work.

## **2. Literature Review**

### **2.1 Structure and Methodology of the Literature Review**

In terms of methodology, we can understand the following Literature Review as a process with three separate stages: research of potential articles, filtering through articles using the abstract as a reference and then reading and summarizing the articles to bring content into this Literature Review and help in the understanding of the opportunity construct and the concepts which surround this construct.

To this end, we started with a SCOPUS and ScienceDirect search which yielded a total of 197 initial results, achieved with the terms “entrepreneurship, entrepreneurial, innovation, opportunity, creation, discovery, business, model” combined in different “or” and “and” relationships (example: “entrepreneurship and innovation and creation”) . From this initial set of results there was a selection of 29 articles for an initial approach and other references were found throughout the reading and development of the thesis, both as a part of the Literature Review and posterior development of the model. The full set of references is featured in the “References” section of this work.

The first and most crucial question of our Literature Review is what we can, after reading the available research on the topic of entrepreneurial opportunities, understand about the concept and what is the current state of research on this construct.

### **2.2 The context of the “entrepreneurial opportunity” in entrepreneurship research**

This section will be devoted to providing the reader with a set of concepts and information which will clarify some of the language used throughout this dissertation.

We will start with the concept of entrepreneurship (or entrepreneurial action). Entrepreneurship can be understood as the creation of new businesses by a specific agent, the entrepreneur, which distinguishes themselves, and the businesses they create. Some authors believe any agent which “creates” (in the sense of creating something unique) an organization or business is an entrepreneur (Gartner, 1988; Lauchman, 1980; Howell, 1972). The consensus on entrepreneurship, even if there are different approaches, is one in which this activity is the one that brings new organizations and economic activities into existence (Shane and Venkataraman, 2000). Schumpeter (1934)



defines entrepreneurship as the process of doing things that are not generally done in the ordinary course of business routine. This is one of the most influential definitions of the entrepreneurship and, naturally, of the role of the entrepreneur. Timmons (1999, p.101) defines entrepreneurship more broadly, as a way of “thinking, reasoning and acting that is opportunity obsessed, holistic in approach and leadership balanced purposed for value creation and capture”.

Regardless of the definition of entrepreneurship used, either broader in scope, more business-minded or even philosophic in nature, one can only understand the entrepreneurial activity with the interaction between two entities, the entrepreneur and the opportunity. As Venkataraman (1997) points out, the largest obstacle in creating a conceptual framework for entrepreneurship and in understanding the phenomenon has been a rigidity in defining the activity exclusively as what the entrepreneur “does”. Shane and Venkataraman (2000) instead introduce the concept of the “entrepreneurship nexus” (or individual-opportunity nexus), a relation between the entrepreneur (and his characteristics) and the entrepreneurial opportunity (quantity and quality of these).

To this extent, the entrepreneur and the opportunity are related phenomena, in which the entrepreneurship process is the process of recognition of these opportunities and acting upon them, given that a “fit” exists between both. This fit, the nexus, revolutionized entrepreneurship research and renewed its focus not on defining the entrepreneur, but in studying the entrepreneurial opportunity, the process of discovery, creation and exploitation of opportunities, among others.

To what concerns the present study, we will deal with the concept of entrepreneurial opportunity in greater detail in a later section of the Literature Review. For now, we can think of an opportunity as “a situation in which new goods, services, raw materials, and organizing methods can be introduced and sold at a greater price than their costs of production”, according to Shane and Venkataraman (2000). This will provide a good baseline definition to dissect and explore in our latter efforts at understanding the concept, and what are the factors that are critical to the understanding of the “situation” the author refers to.

Lastly, when discussing opportunity recognition (or development), we refer to the preceding steps for the entrepreneur to identify a given opportunity based on their prior knowledge, alertness, social capital, among others, as George et al. (2014) points out. Another take, by Baron (2006), considers it a cognitive process (or processes) which leads individuals to conclude they have identified an opportunity, by “connecting the dots” or seeing underlying trends to support this assumption (delving in the importance of alertness). We will also consider the notion of “opportunity development” and in what way it is distinct from the recognition process.

These processes, of identification or creation of an opportunity, assume an early judgement about its viability, notwithstanding a more thoughtful evaluation of feasibility later (Baron, 2006), to which we will call the “opportunity evaluation”.

## **2.3 The current state of the opportunity construct**

Our analysis of the current state of the opportunity construct will be divided into two parts: one composes the analysis of the concept of opportunity and what is currently the consensus, or lack thereof, around this concept and, in a second stage, what are the current developments to be had on this concept and what can be our contribution to the matter.

On the first part of this analysis, we have gathered a set of definitions of what constitutes an entrepreneurial opportunity, using as a basis the work of Davidsson (2015) in his critical review of 210 papers, and using, similarly, a study by Short et al. (2010). Additional definitions and constructs were found but these two works were the ones found to have a broader range of perspectives.

As Davidsson points out, there isn't much consensus on researchers on what are the "relevant characteristics" of the concept of Opportunity, but also in which way do opportunities come to fruition. This has been the case despite the increase interest and publication volume on the topic since the article "The Promise of Entrepreneurship as a Field of Research" by Shane and Venkataraman (2000), which challenged researchers to have a greater focus on the role of "entrepreneurial opportunities" since he believed entrepreneurial action could only be explained by understanding the individual-opportunity interaction.

The following table (Table 1) presents a set of definitions of opportunity which we found most interesting on three separate criteria, their uniqueness, capability to describe the phenomena and simplicity. These definitions help us map the concept of opportunity and are ordered by date of publication (from oldest to most recent).

*Table 1 - Relevant concepts of "Entrepreneurial Opportunity"*

Definitions of Opportunity	Author
Opportunities arise due to differences across industries in their technological innovations and research and development expenditures.	Zahra (1996);
Situations in which new goods, services, raw materials, and organizing processes can be introduced and sold at greater than their cost of production (...) Entrepreneurial opportunities (...) require the discovery of new means-ends relationships.	Shane and Venkataraman (2000)
A business or technology gap, that a company or individual realizes, that exists between the current situation and an envisioned future in order to capture competitive advantage, respond to a threat, solve a problem, or ameliorate a difficulty.	Koen et al. (2002)
[Opportunities are a] Set of environmental conditions that lead to the introduction of one or more new products or services in the marketplace by an entrepreneur or by an entrepreneurial team through either an existing venture or a newly created one	Dutta and Crossan (2005);
Opportunities involve new products or new services that lead to the creation of new businesses.	Baron & Ensley (2006)

*Table 1 - Relevant concepts of "Entrepreneurial Opportunity"*

The chance for an individual (or a team) to offer some new value to society, often by introducing innovative and novel products or services by creating a nascent firm. These opportunities contain the possibility for economic gain as well as the possibility for financial loss for the entrepreneur(s) pursuing the idea.	Lee and Venkataraman (2006)
Opportunities begin as ideas; they are intuited and interpreted by individual.	Dimov (2007)
An idea or dream that is discovered or created by an entrepreneurial entity and that is revealed through analysis, over time, to be potentially lucrative.	Short et al. (2010)
An idea for an innovation that may have value after further investment.	Kornish and Ulrich (2011)
Opportunities are positive and favorable circumstances which lead to entrepreneurial action.	George et al. (2014)
An entrepreneurial opportunity is a dynamic and unfolding experience which an entrepreneur conceives as a general market need that can be exploited for financial or social gain.	Rubleske and Berente (2017)

Although this is a sample of only 11 concepts for the opportunity construct, we found it to be explanatory of the main issues with the construct in entrepreneurship research, the lack of consensus, particularly on what constitutes an opportunity. There are other problems however with the construct, such as if the entrepreneurial opportunity is created or, in the other hand, whether it exists without the influence of the entrepreneur.

Regardless of the fact we can find differing concepts of opportunity we can also find a few similarities among the several conceptualizations presented. Namely we can understand the opportunity as a set of conditions, as a phenomenon which leads to the creation of a new venture and which has a profitable, or “social gain” dimension.

As hinted previously, a lack of consensus around the concept of entrepreneurial opportunity is present throughout existing literature. There are many perspectives for how an opportunity is “born”, some defending creative will (Short et al., 2010; Dimov, 2007; Kornish and Ulrich, 2011), and others the discovery of a latent market need (Zahra, 1996; Shane and Venkataraman, 2000; George et al., 2014). These two perspectives are the main opposing views regarding the concept of “entrepreneurial opportunity”, and express different theories regarding the nature, and role, of the non-actor (the opportunity or equivalent construct) element in the entrepreneurship nexus.

To this end, the most commonly held classification is the one which distinguishes two theories of entrepreneurial action. This distinction goes a bit beyond the concept of opportunity and deals with the perceived nature of the decision-making context and the nature of the entrepreneur, as Alvarez (2007) points out.

These two perspectives have their origins on two fundamental authors in entrepreneurship research, Schumpeter and Kirzner.

Schumpeter (1934) and his successors, which support the “Creation View”, believe opportunities are not objective phenomena (and therefore not independent from the entrepreneur), they are created by the entrepreneur and its actions when exploring new products or services. Therefore, “creation opportunities” do not exist independent of the entrepreneur’s perceptions (Aldrich and Kenworthy, 1999). In this sense, Schumpeter also puts forward two characteristics of the creation of opportunities, the fact it requires intellect and ample capital, as Casson (2007) points out.

On the other hand, the Discovery View, set forward by Kirzner (1973) assumes that the goal of the entrepreneur is to form and exploit opportunities (Shane and Venkataraman, 2000) and the market imperfections which give way to these opportunities arise exogenously, leaving to the entrepreneur the responsibility to recognize and act upon these changes, which can be of a technological, social or political nature (Shane, 2003).

For a summary of both views and corresponding articles/authors in their support, please refer to the following table (Table 2), summarizing both views:

*Table 2 - Summary of Creation and Discovery Views on the source of Entrepreneurial Opportunities*

Views on the Source of Opportunity	Summary	Articles/Authors in support of this view
Creation View	Opportunities do not exist independent of entrepreneurs. Applies an evolutionary realist philosophy (Alvarez and Barney, 2007).	Casson (1982) Gartner (1985) Baker and Nelson (2005) Cornelissen and Clarke (2010) Schumpeter (1934)
Discovery View	Opportunities exist, independent of entrepreneurs. Applies a realist philosophy (Alvarez and Barney, 2007).	Shane and Venkataraman (2000) Eckhardt and Shane (2003) Shane (2003) McKelvey (1999) Kirzner (1973)

Lastly, some other views have been put forward to try and fill the gaps left by these two dominant views, being one example the work of Dimov (2007) which expresses opportunities as a subjective, unproven, ever changing idea, an iterative process of sorts. This contrasts with the Creation View’s overdependent nature of the opportunity (as it is fully a consequence of the entrepreneur’s work) but also with the Discovery View’s unrealistic notion that an opportunity is fully external to the entrepreneur.

Another interesting contribution to the conceptualization of the entrepreneurship nexus comes from Kitching and Rouse (2017) who rethought entrepreneurial action without a concept of opportunity and replaced it with the notion of a “project”. The “project” can be understood as a resource allocation, or investment, to create new goods and services, under a critical realist approach and describing entrepreneurial action as the realization of these projects limited by the social world. A similar “project-driven”

approach is taken by Casson (2007) but he recognizes that resource allocation is needed to discover the opportunity. Another approach is the constructivist approach by Wood and McKinley (2010) which prefers to think of opportunities as the result of a production process in which they may survive (and be acted upon), or not.

Regardless, the two predominant views are the one proposed in Table 2 and despite a residual work of authors in attempt to escape the limitations of both perspectives, these are still the reference through which the study of entrepreneurial action occurs.

Davidsson (2015) as a response to this rigidity of the field of entrepreneurship research, develops a new conceptualization for the concept of opportunity which is based on three constructs. “External Enablers” are conditions of the environment in which the entrepreneur wants to set up his new venture, and outside of his/her sphere of influence which have the potential of eliciting or enabling entrepreneurial endeavors (technological changes, demographical ones, changes in the institutional framework, macro-economic conditions), and these factors can be either positive or negative. The “New Venture Ideas” construct can be understood as the imagined future venture and the process/means to bring them to market, and these can be exemplified in applications for a technology, new business models or business plans, among other ways to express a new idea. Finally, the “Opportunity Confidence” construct, which is an actor’s evaluation of one, or a combination of these previously referred stimuli, which will be at the basis of his/her decision to create a new economic activity. The interaction between these three constructs can be understood not as the “entrepreneurship nexus” but as the “actor-new venture idea” nexus, which is not only more specific but also leaves the “opportunity” construct out of the equation.

In this study, Davidsson also points out the inconsistencies which exist in the work produced about the concept of Opportunity, these can be summarized into three types of inconsistencies: inconsistencies between the definition provided and the results at hand, the concept put-forward is not respected throughout the research that tries to affirm this concept, and a plethora of definitions which are not compatible with each other. The author also identifies drifts within several authors’ work on the concept.

These three new constructs can express both the Creation Theory and Discovery theory’s main points while understanding the importance of the entrepreneur’s willingness to carry out the opportunity. Additionally, the author also points out some common characteristics for the concept: novelty, uniqueness, scope and change, even if there isn’t enough study nor consensus to map out a set of characteristics most researchers can agree upon.

Furthermore, this follows a previous effort by Alvarez and Barney (2007), which made a significant contribution by conceptualizing the possibility that the formation of opportunities can be explained equally and simultaneously by discovery and creation processes which complement, rather than substitute, each other.

White (1990) also tries to reconcile Kirzner and Schumpeter’s views by focusing on the role of the entrepreneur, emphasizing the entrepreneur’s “imaginative capacity” which discovers opportunities based on uncertainty and expectations formed in the process, so an opportunity is simultaneously searched and thought up.

To this end, we find valid both Davidsson's constructs and Alvarez and Barney's work on this issue, since the Discovery and Creation theory represent separate ways for entrepreneurial opportunities to arise, being that these can either be an imagined venture the entrepreneur wants to bring to fruition or a venture which is now possible and attractive due to a change in a set of market, technological, financial, organizational, among other, conditions. To this end, we believe a concept of opportunity needs to understand these two sources of potential ventures and, at the same time, understand what the relevant characteristics are essential to the concept.

We propose, for the sake of this work and for future consideration the following definition of an entrepreneurial opportunity. An entrepreneurial opportunity can then be understood as a (set of) condition(s) which allow for the viable introduction of an innovation, in the form of new products or services, new organizational models, or new customer strategies, in the market.

## **2.4 Opportunity Development & Opportunity Recognition**

In this Literature Review another topic arose from the study of the opportunity construct. Since we have previously discussed what were the dominant views on the sources of opportunity (whether created or discovered), we should now try to understand more of the opportunity recognition (also named "discovery") process. We frame opportunity recognition as the process in which an actor (the entrepreneur, or team) identifies opportunities based on a set of conditions (per George et al., 2014). Examples of the conditions set forward can be found in literature and range from cognitive frameworks (Baron, 2006), to predisposition and personal characteristics (Shane et al., 2010).

Although many of these conditions have been put forward as hypothesis to which factors may explain why some entrepreneurs can identify opportunities better than others, two problems were found. Firstly, the opportunity recognition process seems very tied to the opportunity discovery view, which means many of the factors in here apply for the recognition process but, on the other hand, considerably less research has focused on understanding if these same factors apply to an opportunity creation context. Secondly, despite a plethora of factors which can be of interest to explain the entrepreneur's process of identifying an opportunity, little validation has occurred on the matter and we still don't have a study on what subset of these factors can be relevant for entrepreneurs or innovators. The dialogue, as pointed out by Georget et al. (2014) has certainly improved, although this development in the theory about the opportunity recognition process and its associated factors hasn't been validated by empirical research, which is sorely lacking. On the other hand, the list of factors identified is incredibly fluid and some factors, such as genetics (Shane et al., 2010), have been underdeveloped since they fall out of mainstream management research.

To recover a previous topic, there seems to be an apparent incompatibility between the opportunity recognition process and the "creation view" of the opportunity construct. To this effect, we can understand the opportunity recognition process as similar

to the process of opportunity discovery and the creation of an opportunity as a development process, both of them are however complementary (being the “development” process wider in scope) and as Sanz-Velasco (2006) points out, the “discovery” and “development” (similar to the creation process in this sense) are complementary facets of the opportunity construct, a view supported by Gartner et al. (2003) which claims opportunities are more about what the entrepreneur does, than what he/she sees.

We took the systematic literature review by George et al. (2014) as a basis to understand what the main factors were found for differing capabilities among entrepreneurs to ably recognize entrepreneurial opportunities and develop them, six were found: social capital, cognition/personality traits, alertness, prior knowledge, external environment and systematic search.

Using George et al. (2014) as a basis for our study, complemented with additional research on the topic, we have considered six relevant factors for Opportunity Recognition/Development: Social Capital, Personality, Alertness, Prior Knowledge, External Environment and Resources.

The first five factors were considered in George et al. (2014), although we believe the term Personality better expresses both cognition and personality traits. We also added to our summary of the crucial Factors for Opportunity Recognition/Development “Resources” due to literature found in support of this factor. The “systematic search” factor was also excluded due to being tied to the recognition process and because they refer more to a conscientious effort than a set of resources or factors which influence the Opportunity Development Process. The following table (Table 3) expresses the factors researched in this literature review:

*Table 3 - Crucial factors for the Opportunity Recognition/Development Process*

Factors	Main contributions	Authors
Social Capital	Social Capital can be exploited as a means for obtaining other resources (information, finances, workforce) but it has obligations	Ogzen and Baron (2007);
	Networks are critical for the information and knowledge required to identify opportunities	Van Gelderen (2007);
	Mentors, informal networks and professional forums as sources of social capital have a positive effect on opportunity recognition	Shawn and Carter (2007);
Personality	Individuals who are less risk-averse (have entrepreneurial attitudes) will have a higher probability of identify opportunities and starting a new venture	Lunman et al. (2006);
	Individuals predispose to have less fear of failure judge higher the success of a new firm and tend to see a new venture as an opportunity	Li (2011);
	Genetics also play a role in opportunity recognition	Shane et al. (2010);
	An entrepreneur’s disposition towards trust and vigilance affects the outcomes of their opportunity identification behaviours	Gordon (2007)

*Table 3 - Crucial factors for the Opportunity Recognition/Development Process*

Alertness	Alert individuals are more sensitive to market opportunities, since they are keener on detecting signals of market disequilibrium	Gaglio and Katz (2001);
	Alertness, which is about making connections across knowledge stocks and evaluating new knowledge, is an antecedent to opportunity recognition	Webb et al. (2010)
Prior Knowledge	Experienced entrepreneurs tend to develop, over time, cognitive frameworks (which arise from observation of trends and events) which allow them to identify business opportunities and have an advantage on choosing the best (to be understood, more profitable) new ventures;	Baron (2006);
	Knowledge acquired from educational or professional sources shape the entrepreneur's ability to engage in innovation or venture creation;	Cooper and Park (2008);
	Opportunities in proximity are influenced by an individual's access to knowledge	Ramos-Rodríguez et al. (2010);
	Knowledge corridor thesis assumes that work and education experiences channel individuals to certain "corridors" of information and each individual will recognize/perceive some opportunities but leaving others behind	Cliff et al. (2006)
	The entrepreneur's experience and information from various sources may help to recognize opportunities	Van Gelderen (2007);
External Environment	External environmental changes (technology advancements, regulatory changes) create opportunities;	Webb et al. (2010)
	There are two main ways in which the entrepreneur can base his choice of field on observations of the economy. One is to examine the environment of the economy, and the other is to examine projects already underway. We consider these two approaches in turn	Cason (2007)
Resources	A positive influence exists of the resources of the entrepreneur and its ability to discover, or develop, opportunities.	Sanz-Velasco (2006)
	Opportunities in proximity are influenced by individual's possessions;	(Ramos-Rodríguez et al., 2010);

## 2.5 The Opportunity Evaluation process

On the last topic of this literature review we want to discuss the process of opportunity evaluation, which can be understood as the process in which the entrepreneur identifies whether an opportunity's exploration is feasible and desirable, as McMullen and Shepherd (2006) point out. This process is distinct from the process of opportunity



recognition, both from an empirical and conceptual perspective (Grégoire and Shepherd, 2012).

Alternatively, Haynie et al. (2009) defines the opportunity evaluation as simply an exercise of “envisioning the future” and delivers three crucial insights to the process. Firstly, the opportunity evaluation is an evaluation of its attractiveness, or its capacity to generate competitive advantage and entrepreneurial returns to the firm. Secondly, it is a future-focused exercise, based on an expectation of gains which may come from the exploitation of the opportunity in evaluation. Thirdly, it is a first-person exercise and is based on the entrepreneur’s skills, abilities, knowledge and resources. In this sense, this first-person exercise is a continuation of the recognition or development process, where viability is assessed through the gathering and critical analysis of a larger stock of information. As Autio et al (2013) point out, this stock of information (social or technological in nature) heavily influences the process.

This is an important concept since we are using a wider approach based on accepting both opportunity creation and discovery as complementary views. Through a discovery lenses, an opportunity will always presume an evaluation by the entrepreneur who recognizes it, as Sarasvathy et al (2010) points out. In our understanding, this is not true, since the discovery process, in practical terms, can give wave to a very incomplete picture of the opportunity, which is then complemented by further analysis. In what concerns the creation process, creating a new business model, technology, organization, or strategy (and therefore, conditions which are integral to the opportunity construct) can be seen in the same way. In this case, instead of an incomplete picture (as it happens in a discovery process) we have a series a unvalidated hypothesis, which then can survive, or not, an evaluation process.

The factors which are key for a positive evaluation of the entrepreneur of a given opportunity are varied and can range from customer demand, to technological leadership and development, the capability of the management team and even stakeholder support, as Choi and Shepherd (2004) point out. Another important set of factors are emotions (both inherent, or trait, and state emotions), which influences the appraisal process and tendencies (Foo, 2011)

Despite the opportunity evaluation process not being a focus for our model’s development, it was important to recognize the role of viability and feasibility as this assessment precedes the venture creation stage (Choi and Shepherd, 2004; Shane and Venkataraman, 2000)

## **2.6 Summary of Literature Review**

In the Literature Review it was presented a summary of the state of entrepreneurship research in four topics, to prepare for the next stages of this work.

Firstly, by framing the study of management and entrepreneurship by an initial approach to what can be considered entrepreneurship, and, by extension, who is the entrepreneur. It was also useful to present a broader perspective of what may constitute an opportunity, and introductory notes on the opportunity recognition, development, and evaluation processes.

In a second stage of the present review there was an effort to then reduce the scope of the topic at hand and focus on the opportunity construct. In this section we have constructed a definition for the concept of “entrepreneurial opportunity” based on previous research on the topic.

A third stage of the literature review was focused on the opportunity recognition process and what were the factors which influence it. We found these to be Social Capital, Personality, Alertness, Experience, Prior Knowledge, External Environment and Resources. These factors are crucial to understand the process of identification of an opportunity or, in other words, how entrepreneurs “connect the dots” and discover that an opportunity exists and is available to be exploited. Another important concept is the one of opportunity development, in which an entrepreneur shapes the set of conditions which constitute the opportunity or outright creates some of these and, in this sense, the same factors can be crucial to the process.

Lastly, some reflections were made about the process of opportunity evaluation. Since we have already characterized the entrepreneurial opportunity, what is its development or recognition and what factors are key, then a link between the opportunity and a new venture needed clarification. The last step before the venture creation, the process of opportunity evaluation is, according to literature, the process of analysing, from a first-person perspective feasibility and viability according to present capabilities and expected future gains.

### **3. Methodology**

#### **3.1 Research Question**

After the conclusion of the Literature Review, important questions were left to address regarding the field of entrepreneurship research. In this sense, the following knowledge gaps were identified:

- The lack of attempts to join the Discovery and Creation View as alternate sources of opportunity and define a model with this basis, uniting both contexts and presenting them as complementary;
- A lack of adequate constructs for a concept of Opportunity which can fulfill the three main elements of the nexus, the entrepreneur's creativity, the entrepreneur's cognition and preferences and the external conditions which make opportunities appear, or become feasible;
- A clarification on what characteristics are important for the actor's development or recognition of an opportunity;
- A model which explains the opportunity under the Front-End of Innovation, and its main elements in a clear way which future research can validate further;

After identifying these knowledge gaps, this work can now delve on what are the important research questions to pose. In this sense, the knowledge gaps identified will provide a basis for the main research question and auxiliary research questions that may surge throughout the process. These questions are essential for the focus needed for academic research and will guide the research effort to obtainable conclusions.

The main research question for this research endeavour is:

*How can we model the entrepreneurial opportunity and the entrepreneurship nexus, using in complement a creation and discovery view?*

#### **3.2. Research Design**

The approach for our research effort will be based on a Design-science approach (Winter, 2008) with the construction of a set of artefacts, a model and a component for

the evaluation of both outputs. Therefore, the main goal of our research effort will be to produce a framework which describes the opportunity construct, the opportunity recognition and development process and other facets which are critical to understanding these concepts, as the reader may notice when we exposed the secondary research questions.

The Design-oriented research has a long tradition in Europe, being differently visible and considered a viable, or even the default option, depending on the region at hand (White, 2008). But to understand the design-research approach it would benefit some clarification on what this approach is, and, in this specific case, what will be developed with this approach in mind (in the next section). This approach has a very clear goal, to develop a “means to an end”, the artefacts, models and processes in order to solve a given problem (the research question), as Holmström et al. (2009) point out.

Hevner et al. (2004) defended the design-science paradigm as a problem-solving one. March and Smith (1995) have set forward a classification of artefact types, widely accepted as the standard for Information Systems design science research. These are: constructs, models, methods and instantiations. The first artefact type, constructs, constitute the “building block” and most elementary type of artefact, as concepts which can express problems. Constructs are, in effect, the language used to specify problems (Winter, 2008). Models are the usage of constructs to represent problems and solutions, they relate constructs and create a comprehension of phenomena with these relations. Lastly, methods describe processes which can teach the user how to solve a given problem. Instantiations are then specific types of artefacts used to solve a specific problem and an information system is an aggregate of instantiations of each of these artefact types.

As Hevner et al. (2004) point out, March and Smith (1995) also identify two design processes, build and evaluate. Hevner et al. (2004) provide a framework for Information Systems Research in which the develop/build activity can be achieved through Theories and Artefacts and can be assessed/refined through evaluation processes (Analytical, Case Studies, Experimental, Field Study or Simulations).

In our specific case, we plan on building a model for the entrepreneurial opportunity, which will relate several constructs such as the “Actor(s)”, the “Opportunity”, “Creation” and “Discovery” processes, the conditions which make an “Opportunity”, among many others.

The evaluation method used for assessing our model for the Entrepreneurial Opportunity will be part descriptive and part experimental. Informed Arguments and Scenario construction are the descriptive methods used to validate the model but interviews (which can be thought as an experimental method) were also conducted to improve its reliability and to iterate. In this sense, the developed model was assessed and built simultaneously, using these methods as ways to strengthen its usefulness.

### **3.3. Methodology for developing a Model for the Entrepreneurial Opportunity**

Having established a simple explanation of the key elements of an agreed classification of artefacts to conduct design-science research, we can now move on to the goals, expected output and process of establishing a Model for the Entrepreneurial Opportunity construct and surrounding phenomena.

Our goals for the model are the following:

- This model should allow the reader to understand the concept of entrepreneurial opportunities and how these opportunities come to shape, what conditions and factors define this process and what other entities and phenomena are important in this process;
- The model will be made to combine alternate views on the opportunity construct and build a set of constructs which guarantee compatibility between these views;
- The model should be validated in existing literature and outside of it through interviews and instances, one for an entrepreneurship context and another one for an innovation context, so it can be applied to real-world scenarios and have its robustness tested through the development of instances for the model.

We can then identify three separate stages for the development of our model for the description of the entrepreneurial opportunity, these are:

1. Development of the Model (building constructs and model): The model was developed using UML (Unified Modelling Language), as defined by Booch et al. (1999) due to its simplicity and systematic approach. This initial approach to the model was conducted through the discussion of findings and hypothesis creation for each building block of the model.
2. Validation of the developed model (evaluating the built artefacts): To this end we have done interviews with four different experts, two academics and researchers on this field, one entrepreneur and a project manager which works at the University of Porto's TTO/Innovation Office. After each interview the model was reworked according to the feedback provided and, in several instances, severe changes were made to accommodate these experts' opinions on the matter. Additionally, another source of validation for the hypothesis in the model was the "informed arguments" approach carried out, where every connection and concept introduced was validated with previous literature.
3. Instantiation of the model for two specific cases (evaluating the built artefacts): Per Hevner et al. (2004) design evaluation methods for Information Systems Research, we used scenarios to test the model's utility, using real-world cases and applying them to the model. This approach was chosen since using design-science research methods it is possible to increase the relevance of studies in management and in similar fields of study, as Dresch et al. (2015) points out.

The next section of this dissertation will be about the proposed model for the opportunity construct and the reader may find in the next section the presented model, its building blocks and literature support to any of its components.

## 4. Proposing a Model for Entrepreneurial Opportunity

### 4.1 Background of the proposed Model

In this chapter it will be described the developed model to explain the entrepreneurial opportunity, the entrepreneurship nexus and the interaction between adjacent phenomena, while using both a creation and discovery view and according to the proposed definition for the concept of entrepreneurial opportunity:

*An entrepreneurial opportunity is a (set of) condition(s) which allow for the viable introduction of an innovation, in the form of new products or services, new organizational models, or new customer strategies, in the market.*

To this end we have started our representation using the ontology developed by Pereira (2018) for the Front-End of Innovation. We have also sampled other entrepreneurial models and contributions to inform our model and have a base schematic for how the opportunity is created/discovered and what are the outputs of an entrepreneurial opportunity. The model was built with UML and more information of each relation established in the diagram can be found in Annex III.

In the following table (Table 4) the reader may find the relevant models we used as a basis and what was the contribution of each to the proposed model:

*Table 4 - References for the Proposed Model and their contribution*

Bibliography	Model	Contribution
Baron (2006)	The Potential Role of Pattern Recognition in Opportunity Recognition.	Allowed us to map a few key characteristics for the Opportunity Recognition process, namely Actor's Alertness, Prior Knowledge and Personality, since cognitive Frameworks are encompassed by this characteristic.
Webb et al. (2010)	Marketing and the Entrepreneurship Process.	It was an important realization to understand the outputs of the Innovation process. Also validated some important factors for characterizing the socioeconomic context.

*Table 4 - References for the Proposed Model and their contribution*

George et al. (2014)	The opportunity recognition framework as conceptualized in literature with accompanying illustrative citations.	Allowed the mapping out of key characteristics of the entrepreneur which are crucial to the opportunity recognition process.
Moore (1998)	Model of Entrepreneurial Process.	Simple model that was useful to find validation in personal and environmental factors which play in the Opportunity Development process.
Timmons (1999)	Timmons's framework/model of Entrepreneurship.	Revealed the importance of Resources and the perspective of team (not just the individual) for opportunity development. Timmons's model was also relevant due to the simple way in which it reveals the interaction between resources, actor(s) and opportunity.

Using these models, as well as the FEI Ontology by Pereira (2018), the remaining work of the model was the result of validation, creativity and “pivoting” with previous literature acting as a building block every step of the way. The developed model is divided into two separate portions, one which explains the response to the opportunity and another which represents the source of the entrepreneurial opportunity.

In this section we presented some background information on the proposed Model for the Entrepreneurial Opportunity (EO Model). The model is divided into two larger sections, which will be presented in the following chapters, these are the “Opportunity Development Process” and the “Opportunity Output” sections.

## **4.2 The EO Model - The Opportunity Development process**

In this section, the Opportunity Development process component of the Entrepreneurial Opportunity Model will be presented, in three separate sections, followed by the supporting literature of each building block and additional concepts and information, as justified. There are three parts to this section of the model, the process of “Opportunity Development”, the “Actor(s)” characterization and the Internal/External environment and its influence on the “Actor(s)”. These are presented, in this order, in the following sections:



### 4.2.1 The Opportunity Development Process

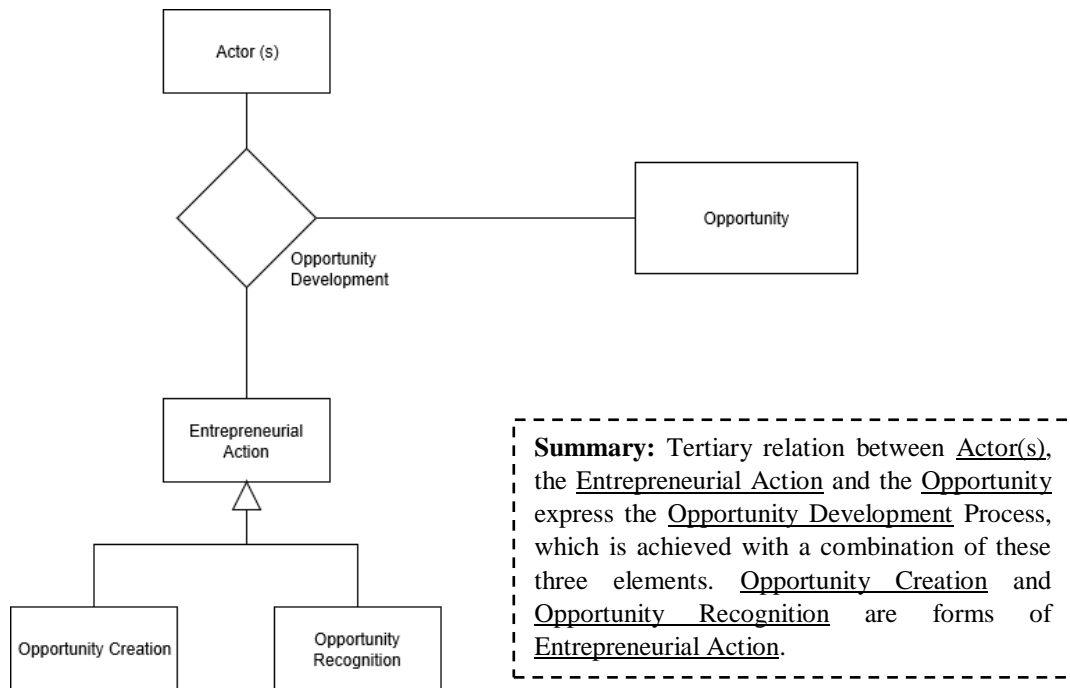


Figure 1- EO Model: The Opportunity Development process

The process of opportunity development can be achieved with recourse to an opportunity recognition or opportunity creation process (Sanz-Velasco, 2006). The Opportunity Development process happens when an Actor (or team of entrepreneurs) acts (an entrepreneurial action) to form or exploit an opportunity (Alvarez and Barney, 2007). There are other classifications of entrepreneurial action, used interchangeably with entrepreneurship, that describe this process as the process of forming a new venture. We have however used the former meaning.

The opportunity development process can be understood as the process in which the entrepreneur either discovers conditions related with the opportunity at hand (Shane and Venkataraman, 2000), for example, by discovering a new market condition in the form of great demand for wearable technology. It can, however, also create these conditions him/herself (Alvarez and Barney, 2007). An example in line with this can be thought when the actor develops a new battery technology which will increase cost-effectiveness of wearable devices, and patents it, creating a new technological condition which enhances the previously detected opportunity.

#### 4.2.2 The Actor(s) in Opportunity Development

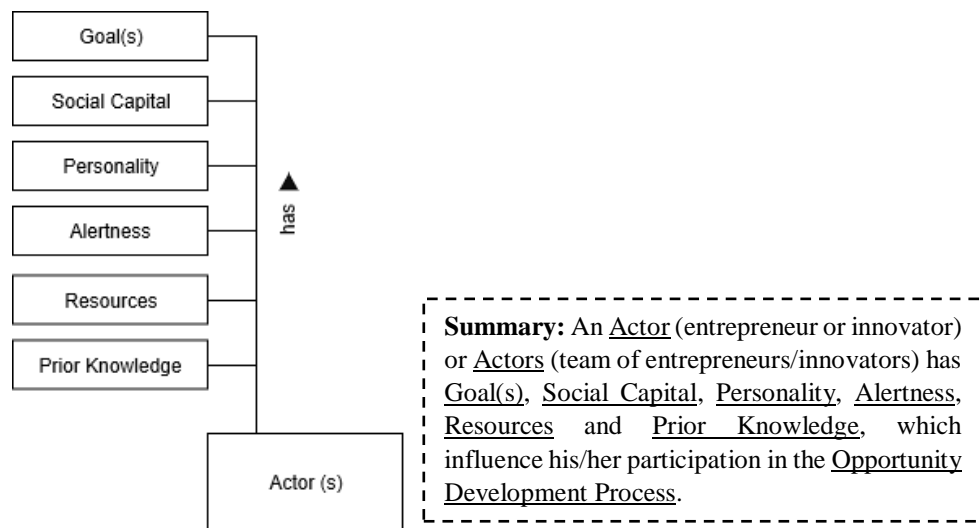


Figure 2 - EO Model: The Actor(s) in Opportunity Development

The Actor(s) can be understood in this context as the entrepreneur/innovator or team (of these same profiles) which is influenced by a set of personal characteristics and environmental factors. In what concerns these personal characteristics, there are specific characteristics which make the actor (or actors) more capable of detecting (and developing) opportunities than its peers (George et al. 2014; Baron, 2006).

An important factor in this ability for the actor to develop opportunities is Prior Knowledge, since it is pointed as a prominent factor in explaining the uneven distribution of opportunity exploitation (Chiasson and Saunders, 2005). In fact, previous prior knowledge, either by using explicit or tacit knowledge (Marvel and Droege, 2010), other sources of information from professional, social and educational contexts (Cooper and Park, 2008). In fact, no matter the source, a larger stock of information may contribute to a lower search effort and a greater ability to discover opportunities (Baron, 2006; Shane and Venkataraman, 2000) and as an essential component for creating opportunities, in conjunction with other factors such as social capital (Lett et al., 2008). As Baron and Ensley (2006) note, experienced entrepreneurs also have a better chance to successfully develop and discover opportunities due to their knowledge stock and cognitive frameworks, influenced by their success and failures.

Another factor discussed in Literature is the Resources the Actor(s) has at their disposal to develop the opportunity, be it financial, human, equipment, IP, among others. As noted by Haynie et al. (2009), the entrepreneur's assessment of an opportunity is based on a compatibility between the entrepreneur's human capital and the firm's current endowment of resources. Additionally, the efficiency of the resources which are applied to form a new venture will also depend on this "match". Sanz-Velasco (2006) has also claimed the importance of resources for the opportunity development process, and as a key component of the opportunity itself, since entrepreneurs adapt their development of

opportunities to their existing resources. Some differing views exist on this topic, given some authors believe the entrepreneur instead shapes their resource base to the opportunity (Bhidé, 2000).

Similarly, one of the characteristics more widely discussed in literature is entrepreneurial Alertness and it has been studied in close relation with the phenomenon of entrepreneurial opportunity recognition (Gaglio and Katz, 2001). Gaglio and Katz (2001) point to the relation between the individual's alertness and three other behaviours of entrepreneurs, their ability to recognize signals of market disequilibrium (which leads to the identification of an opportunity), to change their strategy to non-conforming information and to seek objective accuracy when presented with this information, thus refining their perception of market variables. Webb et al. (2010) support this vision of Alertness has a crucial factor for opportunity recognition, since the motivation to analyse trends and create an image of the future (an imagined venture) allows the individual to form and evaluate new knowledge stocks as well as connect existing knowledge stocks. This, in turn, allows the entrepreneur, when enabled by other factors, to "connect the dots". Endres and Woods (2007) also define Entrepreneurial "alertness" as this behavioural propensity to problematize and generate knowledge through an heightened ability to detect market trends.

To note, Alertness is a characteristic of the Actor which depends on an existing set of factors and is intertwined with other features, such as social capital, prior knowledge and personality traits, as Ardichvilit et al. (2003) affirm. Other authors have also reconciled these differing factors in frameworks which can enhance the comprehension of the opportunity recognition process, such as Baron (2006) which stresses the importance of social capital and systematic search. All in all, alertness has been agreed, by many scholars, as an important factor for opportunity recognition (Shane and Venkataraman, 2000; George et al., 2014).

Alertness can be thought then as an entrepreneur's ability to see situations from a new perspective more frequently than someone with a lower alertness, interpreting data and extrapolating keen insights for opportunity recognition from knowledge available to many, but only interpreted by some in this fashion (Kirzner, 1973). This is, as was already mentioned, due to the unique characteristics of the Actor(s).

However, most literature on entrepreneurial alertness focus on its importance for opportunity recognition, not supporting alertness has an important factor for opportunity creation or development. In this end, the argument can be done that the aspects which make alertness an important factor for the entrepreneur, his/her ability to interpret information differently and detect "trends" can be applied to discover new opportunities but also to enhance his knowledge of market flaws and then correct them with the creation of conditions (market, technological, organizational...) which leads to new opportunities.

Another key factor for the entrepreneur's capability to develop opportunities is his/her personality traits, a very controversial topic in literature according to George et al. (2014). Baron and Tang (2011) affirm the positive effect of creativity on innovative performance. Additionally, Risk-taking individuals are also capable of perceiving opportunities and acting on them (Baron, 2006), as well as individuals who have less fear of failure (Li, 2011).

Baron (2006) also found that entrepreneurs' creative capacity is higher than that of the general population, as well as being more optimistic. Shane et al. (2010) also claimed imagination, curiosity and open-mindedness as key qualities and, lastly, Alvarez and Barney (2007) claim absorptive capacity, intelligence and cognitive abilities make entrepreneurs more capable of processing information for the discovery or creation of opportunities.

Other factors are discussed throughout literature, on the topic of personality traits, including self-efficacy, the need for achievement, need for independence and even the locus (or propension) to control and although the importance of personality traits, either explicitly or implicitly, to business processes is acknowledged, this field lacks research to ascertain which factors are indeed crucial (George et al., 2014). What seems to exist is a consensus on certain characteristics, namely creativity, risk-taking and intelligence, but many others exist and until further studies can be more precise about which characteristics are crucial, the field of entrepreneurship research will continue to "bundle" these characteristics as personality traits.

For this model we have defined personality traits as set of attributes of the individual that can facilitate the identification of opportunities and the creation of new firms, being a key component of the entrepreneur's personality and way of thinking.

Another important characteristic the actor can have which influences the opportunity development process is Social Capital. Social capital can be thought of as "the number of people who can be expected to provide support and the resources those people have at their disposal" (Boxman et al., 1991, p.52) or similarly as a resource for "actors to secure benefits by virtue of membership in social networks" (Portes, 1998, p.6). Both these definitions cover the essential aspects of understand social capital, the resources made available through relations between actors and the membership/belonging in certain social structures as a prerequisite for this availability.

Social Capital is a phenomenon frequently associated with entrepreneurship research and has been widely studied (George et al., 2014). Using social capital is then widely understood as an important process to obtain knowledge and resources in the opportunity development process (Ardichvili et al, 2003; Shane and Venkataraman, 2000; Baron, 2006), sometimes even resources elsewhere unavailable, or scarce (Fuentes et al., 2010). Audretsch et al. (2011) underlines the importance of social capital for individuals to access relevant resources, but also knowledge, important for identification and exploitation of entrepreneurial opportunities. Van Gelderen (2007) adds that while social capital may be exploited to obtain resources it also comes with obligations.

Social Capital can then be understood as an important characteristic of the Actor(s) which allows access to resources she/he currently do not possess, enhancing her/his capabilities for opportunity development.

Last, but not least, Goal(s) are an important factor on the Actor(s) side which contributes to the opportunity development process. The factor was initially brought up in our validation process and it includes the set of goals the team/entrepreneur has regarding its own future and future ventures, regardless of them being conscious or underlying goals. Collins and Porras (1991) define vision, in part, as an image of the

future based on long-term goals. The entrepreneur's (or team's) goals are also a reflection of their personalities (Naffziger, 1995).

Motivational factors are, as Shane et al. (2003) notes, important in explaining entrepreneurial action (particularly firm founding) and important motivational factors acknowledge by the authors can be fitted in our definition of "Goal(s)", such as the "need for achievement" and the importance of "goal setting" as motivational factors. Higher and more ambitious goals are in line with better performance (Locke & Latham, 1990), as well as passion in the context of entrepreneurship (Baum et al., 2001). Timmons (1999) also claims entrepreneurs who hold stubbornly to their goals and who hate giving up have a higher rate of success than those who don't.

#### 4.2.3 The Internal and External Environment in Opportunity Development

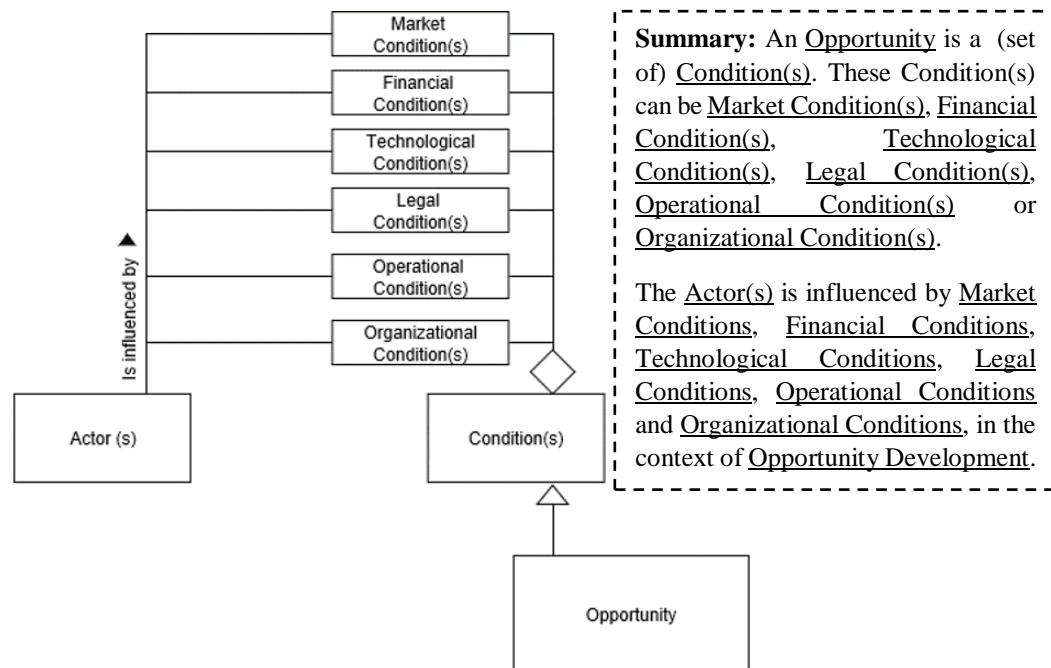


Figure 3 - EO Model: Internal/External Environment & Opportunity

As proposed previously, the opportunity construct, at the heart of this model, can be understood as a (set of) condition(s) which allows for the viable introduction of an innovation, in the form of new products or services, new organizational models, or new customer strategies, in the market. Literature has addressed the opportunity construct in a wide variety of matter but there is support for the existing of the opportunity as a set of conditions, either through the conceptualization of the opportunity as a market gap (Koen et al., 2002; Rubleske and Berente, 2017), a technology one (Koen et al., 2002; Zahra, 1996) or as unspecific a set of favourable circumstances (Shane and Venkataraman, 2000; George et al. 2014).

However, the opportunity, under our definition, is a set of conditions from a larger socioeconomic environment, which influences the entrepreneur and can be influenced by it. These include both external and internal conditions. For example, Organizational conditions can pertain to a future venture or to the company the innovator is part of, right now. Theoretically, Disequilibrium Economics have validated the importance of external conditions as enablers for opportunities to arise (Davidsson, 2015).

Schumpeter (1934) affirms the existence of a broad spectrum of factors such as changes in technology, social norms, political and institutional climate, demographic conditions, which create new information and new stimuli which helps in the process of entrepreneurial action. Baron (2006) while underlining the importance of cognitive frameworks as an important part of pattern recognition, affirms the importance of changes in technology, market, or at an institutional (government policy) level, which will result in the identification of business opportunities. Ozgen and Baron (2007) also define the opportunity as a set of situational conditions arising from technological innovations, sociocultural shifts and institutional changes. These situational conditions create an opportunity for entrepreneurs to provide better solutions, through new means and/or ends (Casson, 1982), but while these external conditions are implicitly assumed to create new markets of customers, little study has been done on the relationship between entrepreneurs and these market characteristics (Webb, 2010). The Oslo's Manual (OECD, 2005) also identifies a framework of conditions who have substantial effects on business innovation, ranging from financial, legislative, market conditions, industry structure, among others. Drucker (2002) also identifies "Industry and Market Changes", "New Knowledge", "Process Needs" and "Demographic Changes" as sources of Innovation, which are different combinations of market, technological, legal and institutional circumstances.

So, while support in Literature exists on what external conditions are influential for opportunity development and venture creation (namely market, financial, technological, institutional conditions), the level of abstraction is mostly kept at "external conditions", "external circumstances" or even "situational conditions", when expressing the relation between these and the entrepreneurship nexus. In terms of internal conditions (in a corporate perspective) for opportunity development, support in Literature was not as easily found, instead empirical studies are plentiful only on what factors are crucial for innovation (Acs & Audretsch, 1988) a step further from the Front-End of Innovation.

We propose the existence of six different types of conditions which influence the entrepreneur's environment and his/her actions, presented in the following table (table 5):

*Table 5 - Types of External/Internal Environment conditions that form the entrepreneurial context*

Type of Condition (s)	Examples
Market Condition(s)	Competition (direct and indirect); Market Size or Total Addressable Market; Expected Market Share; Market growth; Customer Demand; Customer Segments; Barriers of Entry; New Materials for production; Distribution Channels; Customer Preferences, among others.
Financial Condition(s)	Possible Cash-flows; Revenue Sources; Licensing sources and mechanisms; Risks of the business; Expected Profit & Loss; Available funds; Company's capital; Budget for project; Budget for R&D;
Technological Condition(s)	IP owned; Technologies developed; Performance advantage; Performance advantage relative to cost; Technical feasibility; Stage of Development and TRL; Development roadmap; Technological "state of art"
Legal Condition(s)	Patenteability; "Copyrightability" and other forms of protection and their effectiveness; Progress towards intellectual property protection (patents, copyrights, trademark, trade secret); legal framework for IP rights in the country; legal framework for business creation;
Operational Condition(s)	Skills, technologies and other factors needed to produce the product at hand; Scalability; Time to market; Production processes; Flexibility to respond to business model needs;
Organizational Condition(s)	Fit between team skills and project needs; Team stability; Team history; Technical and Business network; Technical development support; Business development support; Company conditions and goals for project;

#### 4.2.4 Opportunity Development Overview

Lastly, an overview of the Opportunity Development process component of the EO Model is presented as well as the Glossary of Terms (Table 6) used in this section.

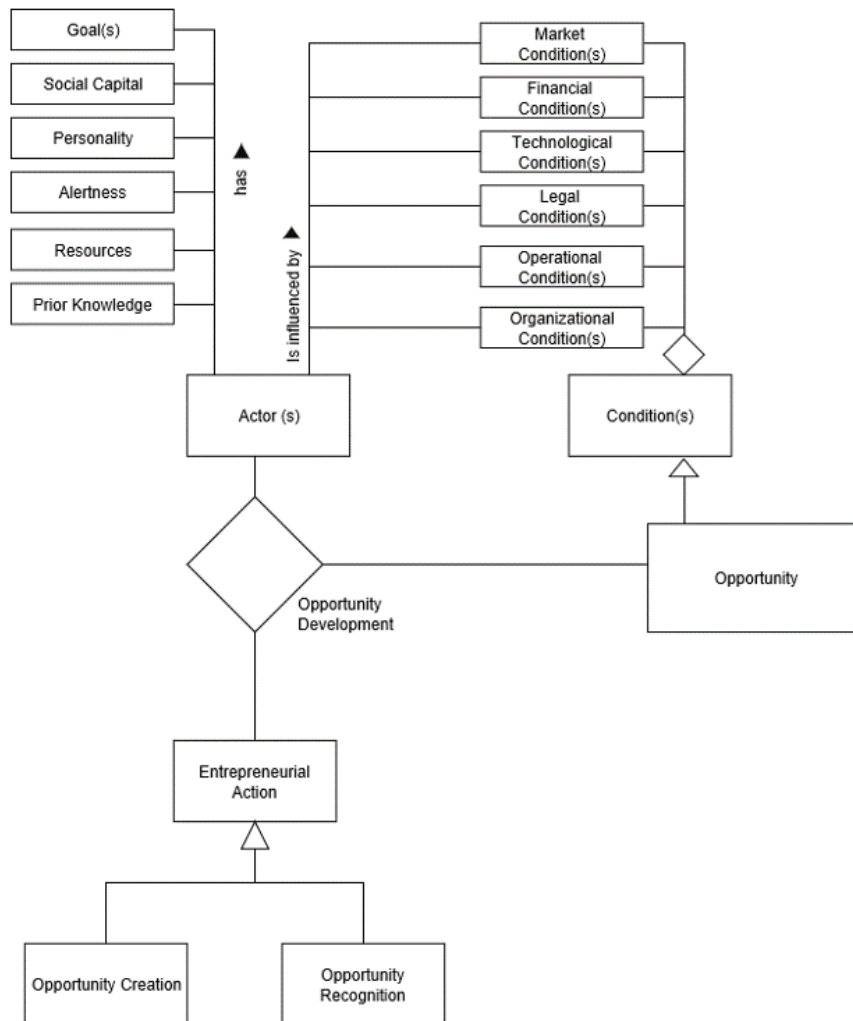


Figure 4 - EO Model: Opportunity Development Overview

Table 6 - Glossary of terms for the EO Model: Opportunity Development

Concept	Explanation	Contributions
Actor (s)	The individual, the entrepreneur or entrepreneur to be which is influenced by several key prominent factors which make him more apt than others in recognizing opportunities (either through a Discovery Process or Creative one).	George et al. (2014); Baron (2006)



*Table 6 - Glossary of terms for the EO Model: Opportunity Development*

Prior Knowledge	A stock of information that makes some individuals more capable of recognizing opportunities than others. A lack of knowledge, skills and experience hinders the process of opportunity recognition.	Shane and Venkataraman (2000); Kourilsky and Esfandiari (1997)
Resources	Assets, intangible or tangible, the actor (company or entrepreneur/s) has available to use in the venture.  These resources can be financial or equipment, for example, or more intangible such as organizational routines, IP, among many others.	Haynie (2009)
Alertness	Introduced by Kirzner (1973), this attribute is the entrepreneur's ability to see situations from a new perspective more frequently than someone with a lower alertness. This is influenced both by his personality but also from his active efforts, the search for these opportunities, classified as Systematic Search (George et al., 2014).	Kirzner (1973); George et al. (2014); Gaglio and Katz (2001);
Personality	From the study by George et al (2014), some attributes of the individual can facilitate the creation of new firms, these are creativity, self-efficacy, the propensity to assume risks, the need for achievement, the need for independence, and the need of control. These were found by previous authors and we can understand them as a key component of the entrepreneur's personality and way of thinking.  Existing support in literature is shorter than other characteristics and some controversy remains on the influence of these traits on the entrepreneurial process.	Baron (2006); George et al. (2014)
Social Capital	Social Capital is a set of social relations (people) which can be expected to provide support and resources, by virtue of the actor's membership to a certain social network. These scarce resources accessed by the entrepreneur help recognize and explore opportunities (Fuentes et al., 2010)	Boxman et al. (1991); Portes (1998); Fuentes et al. (2010);
Goals	The set of goals of the entrepreneur or the team has, composed by His/her vision for his/her own professional future and future ventures. An instance of these goals can be a "New Venture Idea" (Davidsson, 2015). Shane (2003) points to the importance of motivational factors in explaining entrepreneurial action, to which we believe Goals can be a crucial element (in conjunction with personality traits)	Davidsson (2015); Shane (2003)

Table 6 - Glossary of terms for the EO Model: Opportunity Development

Condition(s)	The Internal/External entrepreneurial environment represented by one, or more, conditions. A subset of these conditions represents the opportunity, either because these are created by the entrepreneur (technological conditions can be changed due to a R&D Project), or because these help the entrepreneur discover the opportunity it will act upon.	Authors
Opportunity Development	<p>The process of an individual developing the opportunity, either through the creation of new conditions or the discovery of new factors which play into the opportunity, both alternatives sources of opportunity. This process also depends on the entrepreneur (the Actor) and his own characteristics and influencing factors, as well as the nature of the opportunity at hand.</p> <p>Opportunities are developed throughout the new venture process, continuously, since the early perceptions of the opportunity are always rudimentary (Sanz-Velasco, 2006).</p>	Sanz-Velasco (2006)
Entrepreneurial Action	Entrepreneurial action is defined as any activity entrepreneurs might take to form and exploit opportunities.	Alvarez and Barney, 2007).
Opportunity creation	This process is the process of opportunity formation/exploitation under the "creation theory". In this theory, opportunities are not assumed to be objective phenomena formed by exogenous shocks to an industry or market. Rather, they are created, endogenously, by the actions, reactions, and enactment of entrepreneurs exploring ways to produce new products or services.	Alvarez and Barney, 2007). (with contributions from other authors)
Opportunity Recognition	The process of identifying an existing opportunity and recognizing it has value. Under the Discovery theory an opportunity exists independent of the entrepreneur and his task is to identify it, recognize its value and exploit it. Several explanations can be found for the information asymmetry which lead certain entrepreneurs to discover opportunities others cannot (information corridors; cognition properties for example)	Shane and Venkataraman (2000)
Opportunity	A (set of) condition(s) which allows for the viable introduction of an innovation, in the form of new products or services, new organizational models, or new customer strategies, in the market.	Authors

### 4.3 The EO Model - The Output of an entrepreneurial opportunity

This section of the EO model describes what is the desired output when faced with an entrepreneurial opportunity, in the Front-End of Innovation context. Once again, the following section of the model will be presented in three parts with accompanying literature. These three parts represent the concept of Value in the context of the Opportunity Output, the Agile New Concept Development process and the Innovation which is a product of this process.

#### 4.3.1 Value in the context of the Opportunity Output

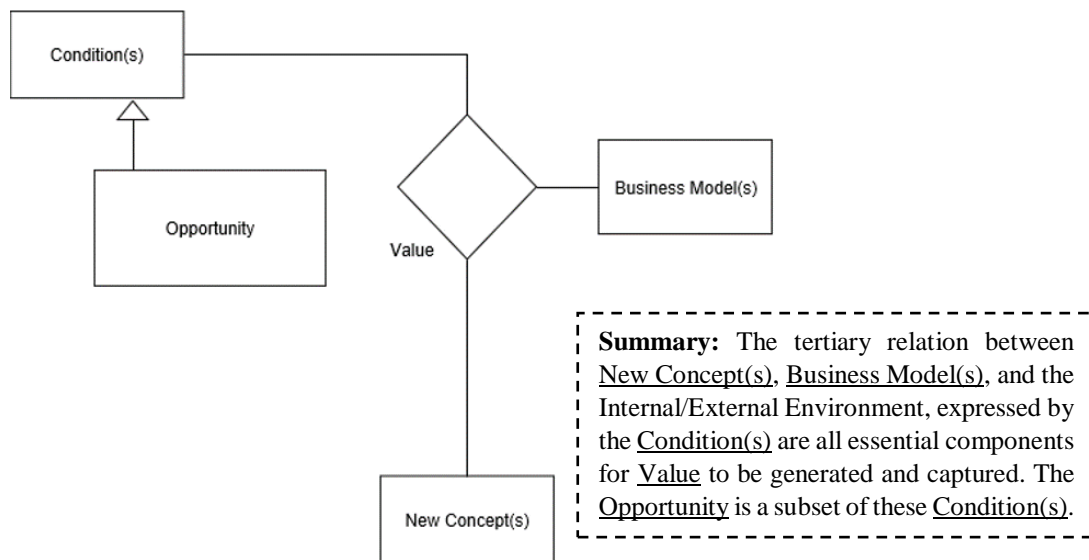


Figure 5 - EO Model: Value in the context of the Opportunity Output

Value, as represented in this model is the result of a New Concept (an envisioned solution which comprises one or more forms of innovation), a Business Model to support this concept (which goes beyond the core solution) and a Set of Conditions which represent the current socioeconomic context. It is only with the New Concept, its respective business model, and the context in which these elements originate (the Set of Conditions) that we can have value, here seen in its economic meaning, as the corresponding satisfaction to a need's fulfilling (to the customer or user of the product/service).

Value, as a measure of customer satisfaction can be created through several elements of the solution provided by a company, be it price, location or quality and, more importantly, is dependent on a marketing and corporate strategy (Hassan, 2012). Value is contingent on a new solution being presented to the market, being achieved with the introduction of innovative and novel products or services (Lee and Venkataraman, 2006).

Martinez et al. (2004) also presents value under an internal perspective, in which value equates to the profit of a given venture. This is compatible with the relation

expressed between the new concept, business model and socioeconomic context, but we believe the wider perspective, based on need satisfaction, is more versatile and can apply, as well, to social entrepreneurship, where value creation is different from value appropriation (Santos, 2009).

#### 4.3.2 The Agile New Concept Development Output

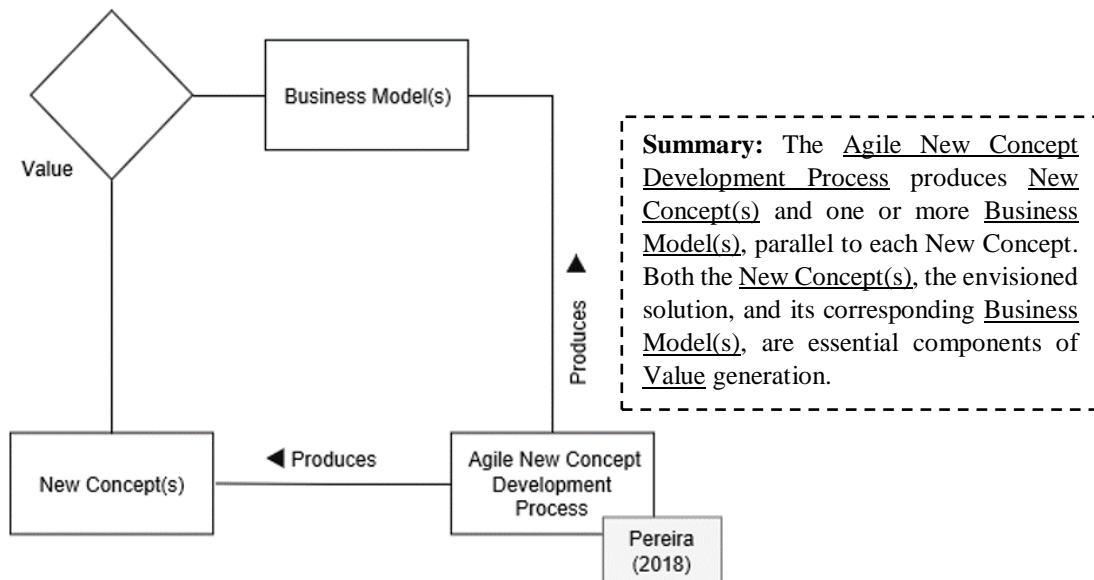


Figure 6 - EO Model: Agile New Concept Development Output

Whenever an opportunity is discovered, and value can be created through a New Concept and a New Business Model, the Agile New Concept Development Process is necessary to create both these responses, a Business Model, and a New Concept.

The New Concept is then produced through the Agile New Concept Development Process, a process in which activities and resources are (re)arranged to support the development of a new envisioned solution for the market (Pereira, 2008). This new concept can be understood as an early idea for a product/service and an input for a product/service development process, in a later stage (Pereira, 2008).

Additionally, this New Concept is related with at least one Business Model, being the imagined ventures corresponding to this early idea of a new innovative solution for the marketplace. The Business Model can be defined as at heart, stories—stories that explain how enterprises work" (Magretta, 2002, p.87). Alternatively, the Business Model can be defined as not only a value proposition, a revenue model, or even a network of relationships, but all the elements combined in one sound strategy (Zott et al., 2013). The most famous definition of the Business Model describes it as the “rationale of how an organization creates, delivers, and captures value” (Osterwalder and Pigneur, 2010, p.14), but an alternate view can be to think of the business mode as “a blueprint for a strategy

to be implemented through organizational structures, processes, and systems.” (Osterwalder and Pigneur, 2010, p.15).

Thus, alternative business models are a possible output of the Agile New Concept Development Process, corresponding to all the possible businesses which can arise out of the created New Concept, even if the entrepreneur hasn’t formulated them specifically in a canvas, model or written statement.

Another important tie between the Business Model and value creation is at the core of most business model formulations, in the form of a Value Proposition, which expresses how the imagined venture can create (and frequently capture) value. A Value Proposition is a “written statement focusing all the organization’s market activities onto customer critical elements that create a significant differential within the customer’s decision process, to prefer and/or purchase the organization’s offering over a competitor’s” (Fifield, 2007, p.443-444).

The Business Model component also has an implicit viability analysis which builds on the information gathered during the Opportunity Recognition process, as Sarasvathy et al (2010) hints at. This viability analysis will then be crucial to the creation, or not, of a new venture based on a new concept to tackle a specific entrepreneurial opportunity. We haven’t dealt the opportunity evaluation process in detail with this model as our goal was to evaluate the opportunity development process even if we can’t escape from the fact that a viability and feasibility analysis is present throughout this section.

### 4.3.3 Innovation & New Concept

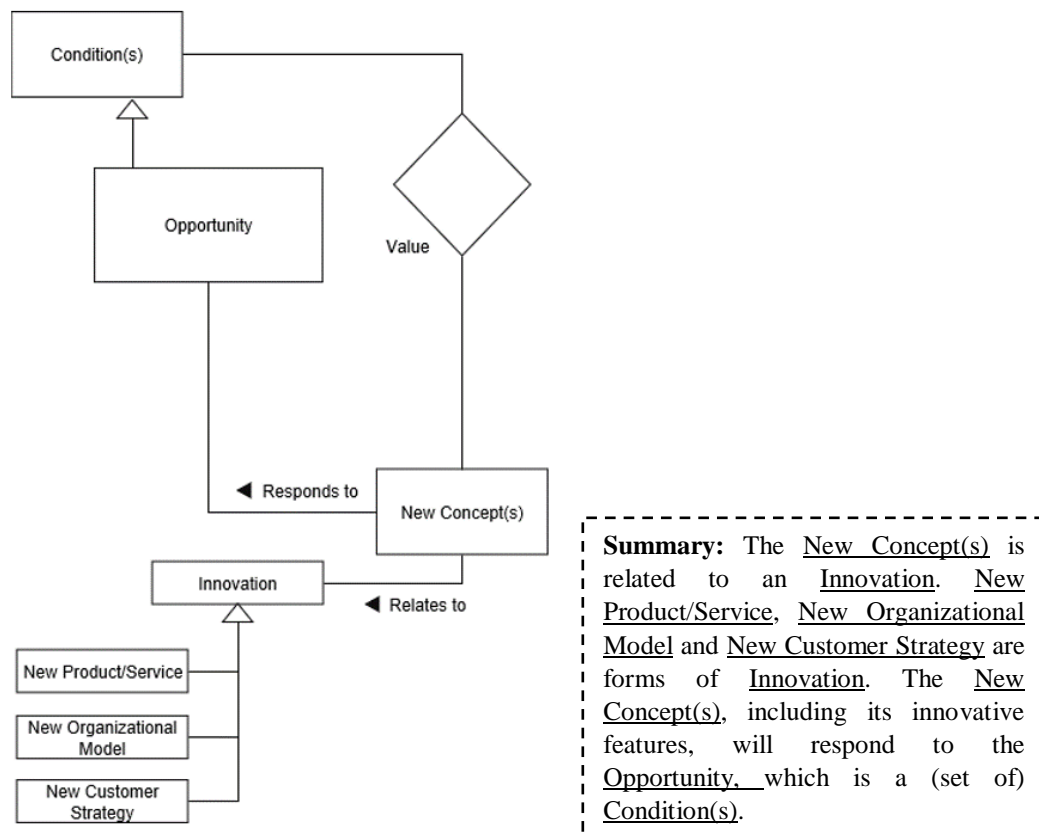


Figure 7 - EO Model: Innovation & New Concept

As previously argued, the Opportunity is a subset of conditions (from a larger socioeconomic context) which allows for the viable introduction of an innovation. Therefore, the New Concept is a response to the opportunity, and must be a solution with innovative characteristics to be considered as such. The concept of an opportunity as a situation which motivates a response from entrepreneurs and companies is well studied in literature (Shane and Venkataraman, 2000; Dutta and Crossan, 2005; Rubleske and Berente, 2017; Koen et al., 2002).

The New Concept formed will have to comprise an innovative solution in order to respond to the opportunity (Shane and Venkataraman, 2000; Lee and Venkataraman, 2006). To frame what Innovation types may constitute this new concept we based our definition on Keeley's Ten Types of Innovation (Keeley, 2013). Keeley (2013) refers to the following types of Innovation (Table 7):

Table 7 - Keley's Ten Types of Innovation. Adapted from Keeley (2013)

Innovation Categories	Innovation Types	How is it innovative?
Configuration	Profit Model	The way the company makes money
	Network	The way in which the company connects with others to create value
	Structure	How the company aligns their talent and assets
	Process	How the company uses superior processes to develop its activity
Offering	Product Performance	How the company employs different features and new functionality
	Product System	How the company creates complementary products and services
Experience	Service	How the company supports and enhances the value of its core solution
	Channel	How the company delivers its offerings
	Brand	How the company represents itself and its offerings
	Customer Engagement	How the company fosters different ways of customer interaction

From these 10 innovation types across three innovation categories we can assert three different ways for a company to innovate (corresponding loosely to the categories), which we used in our model. The three forms of Innovation we considered are “New Organizational Model”, “New Product/Service” and “New Customer Strategy”.

A “New Organizational Model” corresponds to innovations in the business model outside of product offerings and customer interaction. This type of Innovation can be felt with new revenue models, new organizational structures, new processes, and new ways to engage with other companies. It corresponds to the “New Configuration” set of Innovation types, per Keeley (2013)

The second type of Innovation, “New Product/Service” corresponds to the “New Offering” and the Service component of the “Experience” types of Innovation. To this end, a “New Product/Service” is any change to a company’s core offering, be it in their main product, service, or portfolio or in the services which complement this offering.

Lastly, “New Customer Strategy” pertains to Innovations in the way a company interacts with their customers, be it through new channels, new customer relationship means and ways of engagement or even through new brand strategies. This corresponds loosely to “Channel”, “Brand” and “Customer Engagement” types of Innovation (Keeley, 2013).

The Oslo Manual’s definition of Innovation (OECD, 2005) was also a source of information for this section of the model but we found it to be lacking in two aspects: it

was based on Schumpeter’s own considerations on Innovation, which are outdated, and it doesn’t consider changes to the business model outside of changes in the product, service or market components. To this end, this concept is not appropriate to describe new businesses whose competitive advantage is largely based on new pricing models, or marketing strategies and ways to interact with customers, very common in the current entrepreneurship environment.

4.3.4 Opportunity Output Overview

Lastly, an Overview of this section of the model is presented, as well as a Glossary (Table 8) for all the terms used in the Model.

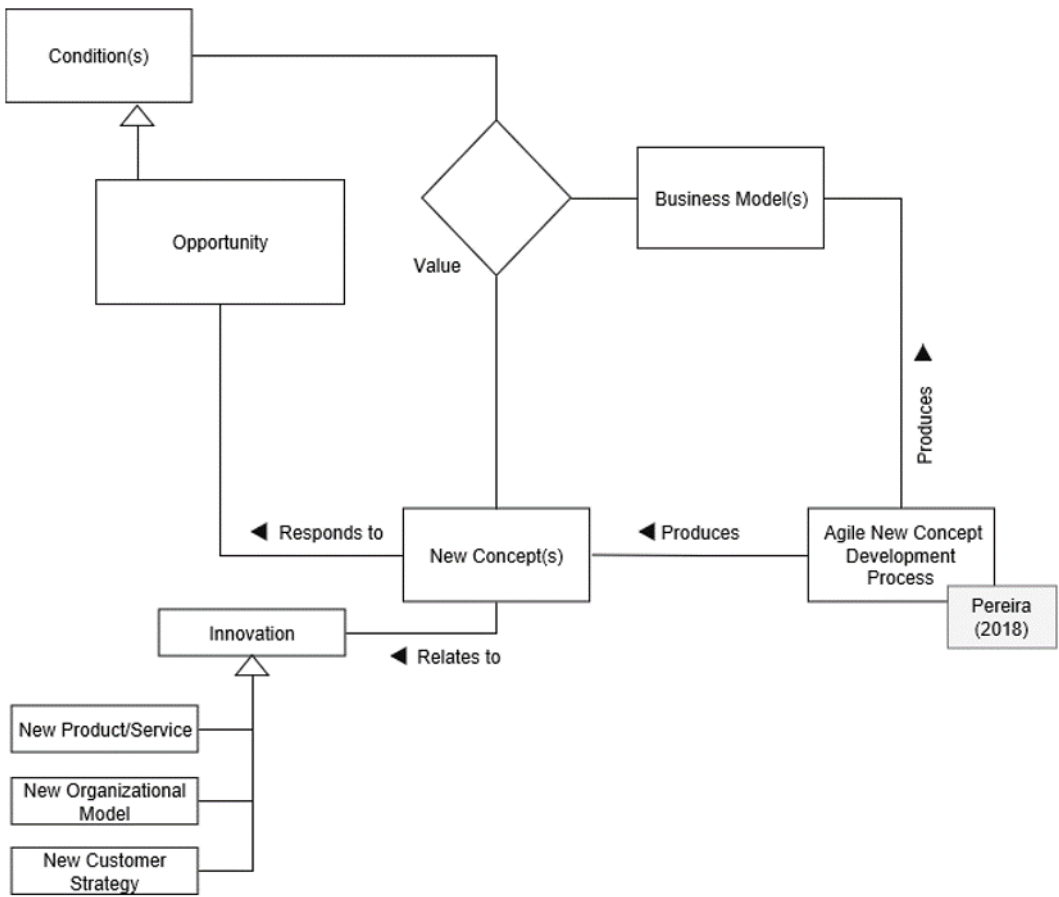


Figure 8 - EO Model: The Opportunity Output Overview



Table 8 - Glossary of Terms for the EO Model: Opportunity Output

Concept	Explanation	Contributions
Business Model	The Business Model is a strategy for companies to transmit how they will conduct business, capture and deliver value and engage with customers and other stakeholders. Can be communicated in different manners, some more formal and others more casual (ex: the Business Model Canvas, the Business Plan).	Magretta (2002); Zott et al. (2013); Osterwalder and Pigneur (2010);
Value	<p>Value, from an economics-centric perspective, is the worth a customer attributes to the usage of a particular good or service. In classic economic theory, this worth is proportional to the importance a need serves.</p> <p>However, value can be seen from two perspectives, an internal perspective (where it equates profit) and an external one, which equates customer satisfaction. The latter is the definition of value used in this diagram and the one useful for our study.</p>	Hassan (2012); Martinez et al. (2004)
New concept(s)	In this sense new concepts are the entrepreneur's response to the market need, these can be goods, services, processes or materials depending on the market need and its respective market. These new concepts can be seen as the new means-ends relationships Shane and Venkataraman refer to when discussing the exploitation of opportunities as the result of entrepreneurial action.	Shane and Venkataraman (2000)
[an] Innovation	<p>An Innovation can be thought of as the set of "new products, business processes and organic changes that create wealth or social welfare", according to the OECD. In this sense, an Innovation can be any new business model, product, technology or other forms of change which can create value in the market.</p> <p>Several forms of Innovation exist, although we used Keeley's "Ten Types of Innovation" as a basis to find three types of Innovation, composed by aggregates of specific types of Innovation.</p>	Vaitheeswaran (2007); Keeley et al. (2013); OECD (2005)
Agile New Concept Development	Process of development of a new envisioned solution for the market which creates a New Concept and precedes formal Product/Service Development.	Pereira (2018)

## 5. Validation of the Proposed Entrepreneurial Opportunity Model

### 5.1. Description of this validation process

Having an initial approach for a Model for the Entrepreneurial Opportunity we believed it would be key to then present this model to academics, researchers and entrepreneurs, as well as professionals in the area, to understand whether the model is accurate, pertinent to the subject and if it can explain, in an approachable manner, the concept of the Entrepreneurial Opportunity.

To this end, we conducted interviews on four different professionals, and academics, which could help us better understand the opportunity construct and gather feedback on the particularities of the Model we have proposed. The interviewees were the following (Table 9):

*Table 9 - Professionals Interviewed for EO Model Construction and Validation*

Name	Occupation and Expertise	Number of Interviews
Professor Maria Alexandra Xavier	Head of INESC TEC's centre for Innovation Technology and Entrepreneurship and Lecturer at MIET.  Expert in Innovation Management with a track record in companies as Sonae, CCDRN & Accenture.	2
Professor Pedro Sampaio Peixoto	Entrepreneur and Invited Lecturer at MIET (Startup Strategy Course), Owner of SG- Serviços de Gestão, Lda. and Manager at RRE – Real Royal Estate S.A.  Expert in Corporate Governance, Management and has worked for companies such as Sonae (Modelo Continente Hipermercados), Coopers & Lybrand, VICAIMA, Amorim Group, among others.	2

*Table 9 - Professionals Interviewed for EO Model Construction and Validation*

João Ribeiro	Entrepreneur, now Head of Marketing and E-Commerce at the Portuguese Startup, Forall Phones.	1
	Has a Masters in Pharmaceutical Sciences, but since very early on has had a passion for Marketing and has completed training by EDIT., Flag and The Wharton School. Worked at Uniplaces as Marketing Manager for Portugal and his area of expertise are Ecommerce, Product Strategy, Marketing and Community Building.	
Joana Carrilho	Project Manager at U.Porto Innovation, the Innovation and Entrepreneurship Office of the University of Porto.	1
	Has been coordinating the Business Ignition Programme since its inception in 2017, has a PhD by ICBAS, U.Porto's Institute for Biomedical Sciences and was previously a consultant for SPI – Sociedade Portuguesa de Inovação.	

These interviews took place between the 17<sup>th</sup> of May 2018, to the 18<sup>th</sup> of July 2018 and there was a total of 6 interviews, lasting between 30 and 45 minutes each. The Interviews were “free-form”, the model was presented, as well as a brief overview of the relations between constructs (due to the use of UML), and we then asked feedback from the interviewees for the validation/refinement of the mode.

After the interview cycle was completed and the model was finalized, we started to develop a second stage of validation of the artefacts produced. In this sense, we developed two instances of the model which are based on public information.

The two instances pertain to different scenarios, one in the field of entrepreneurship (Uniplaces), and another in the field of Corporate Innovation (Swifter by Proctor & Gamble). In the following section, the reader may find a Summary of findings of both processes of validation.

## **5.2. Interviews Overview**

The interview process was one of the key steps in validating the proposed Model and two key areas of the model were heavily iterated due to this process, these were the Actor(s) key characteristics, and the proposed changes were validated in Literature, and the outputs of the Agile New Concept Development Process. In the next table (Table 10), the reader may find the key outputs of the Interview process by Areas of Validation:

*Table 10 - Key Contributions from the Interviewing Process by Areas of Validation*

Areas of Validation & Feedback	Key contributions from the Interviewing Process
Concept of Opportunity	<ul style="list-style-type: none"> <li>- Operational and Organizational Conditions as components of the external &amp; internal entrepreneurial environment;</li> <li>- Market and other types of conditions as indicators of shortage and market need, which can then be used to describe the opportunity;</li> </ul>
Opportunity Output	<ul style="list-style-type: none"> <li>- One of the interviews led us to use The Oslo Manual (OECD, 2005) and Keeley's Ten Types of Innovation (Keeley, 2013) which led to the final definition of Innovation;</li> <li>- Viability and its importance led to the inclusion of the Business Model as an essential part to create value;</li> <li>- The importance of value, its connection with a new concept, a market and socioeconomic context, as well as the need for a business model to deliver value were also result of the Interview process</li> </ul>
Actor Characteristics	<ul style="list-style-type: none"> <li>- Resources has a characteristic of the Actor(s) in the Opportunity Development Process;</li> <li>- Actor(s) also replaced the figure of Entrepreneur/Actor due to the adaptation of the model to corporate innovation, which is done usually in teams;</li> <li>- Goal(s) was suggested by one of the interviewees and remained in the model due to being an important component of the Actor(s) characteristics;</li> </ul>
Validation	<ul style="list-style-type: none"> <li>- Market, Financial and Technological Conditions were further validated with interviews</li> <li>- Concept of Entrepreneurial Opportunity was validated in the interviewing process</li> <li>- Actor(s) characteristics;</li> <li>- Internal and External entrepreneurial environment shouldn't be separated since the set of conditions used may contain both Internal and External factors in several categories;</li> </ul>

### 5.3. Instantiation of the EO Model

In this section, the developed instances will be presented after a brief description of the company/project they pertain to. The instantiation process was three-staged: firstly, information was collected about the company and the case at hand; secondly, an initial approach was developed for the instance of the Model and, thirdly, the instance of the model was discussed and refined.

#### 5.3.1 Scenario I - Uniplaces

Uniplaces is an online marketplace which provides a platform for landlords and students to book temporary accommodation<sup>1</sup>. The start-up was founded in 2012 by its three founders, Miguel Santo Amaro, Mariano Kostelec and Ben Grech and ever since has been growing both in userbase and in landlord listings, as well as in booking numbers. The platform, as of July 2018, reached the 1.000.000 Nights booked mark during for a year and is now present in 6 countries with over 35000 verified properties.

The history of Uniplaces starts with the three founder's team, which, while studying in the UK, discovered the hurdles and problems with renting a flat<sup>2</sup>. The lack of guarantees, high prices, little information on housing conditions, neighbourhood, low possibilities to compare properties and inexistence of a platform focused on shorter term rentals were problems found in this process. To this end, they started to develop the idea of an 100% online accommodation marketplace for students which would allow students to book their stay in advance and would specialize on mid-term rentals (1 to 4 months).

The team of entrepreneurs was the first project to be hosted in Startup Lisboa's incubation program<sup>3</sup>. After less than 18 months, the team was able to get €200K in funding and they were able to jumpstart their business. In 2012, the team raised an additional €2.2M and, in 2016, on their third major funding round, Uniplaces gathered €24M in funding<sup>4</sup>. Uniplaces's solution was not a revolutionary one (even in the entrepreneurs' opinion) but their drive, proactivity and timing were key for the company to become one of Portugal's, larger start-up companies. In the next page, the reader may find the instance of the model developed for Uniplace's case .

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<sup>1</sup> *The three friends making it easier for students to rent a room:* <https://www.bbc.com/news/business-38735566> (accessed 11/07/2018)

<sup>2</sup> *The Grass Is Greener On The Other Side For These Expat Entrepreneurs:* <https://www.forbes.com/sites/alisoncoleman/2015/10/29/the-grass-is-greener-on-the-other-side-for-these-expat-entrepreneurs/#ae1918552a69> (accessed 11/07/2018)

<sup>3</sup> *O segredo da Uniplaces? “Queremos ser o Cristiano Ronaldo e não apenas o melhor jogador do Benfica”:* <http://visao.sapo.pt/web-summit/2016-11-07-O-segredo-da-Uniplaces--Queremos-ser-o-Cristiano-Ronaldo-e-nao- apenas-o-melhor-jogador-do-Benfica> (accessed 11/07/2018)

<sup>4</sup> *Uniplaces Raises \$24M In Series A Funding From Atomico And Angels:* <https://techcrunch.com/2015/11/03/uniplaces-raises-24m-in-series-a-funding-from-atomico-and-angels/#.bfs1crr:0jqs> (accessed 11/07/2018)

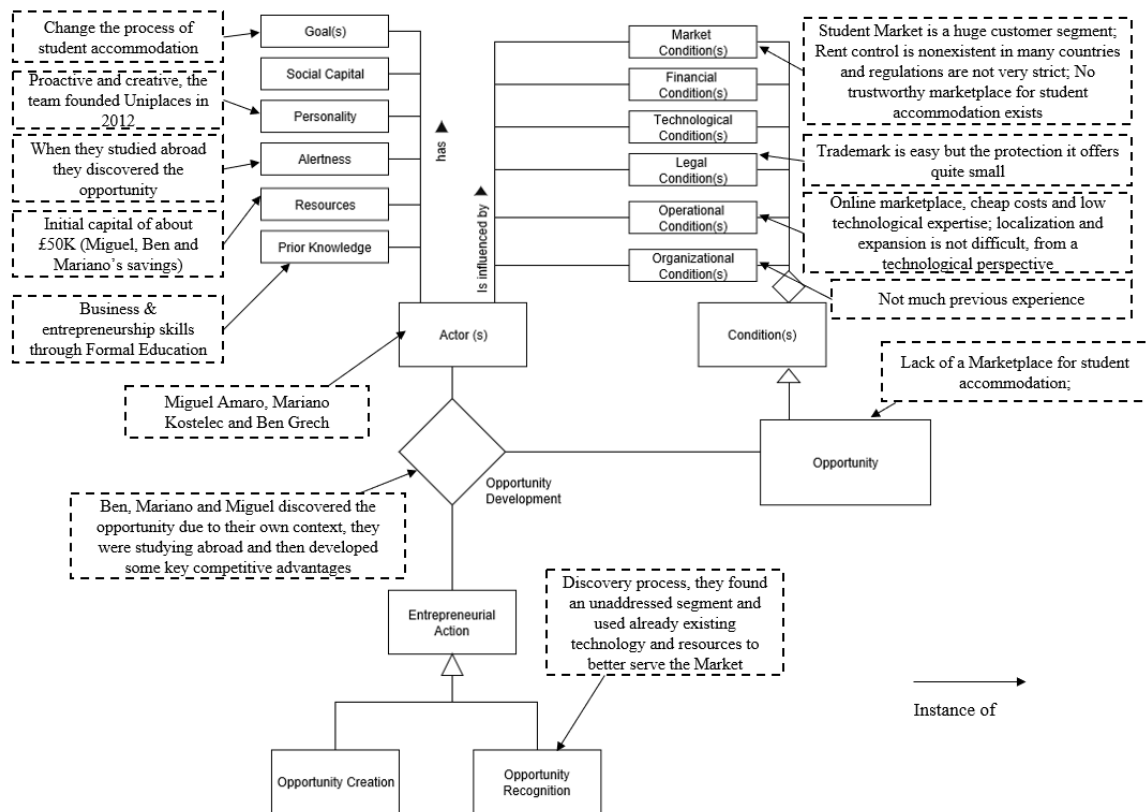


Figure 9 – Scenario I (Uniplaces): The Opportunity Development Process

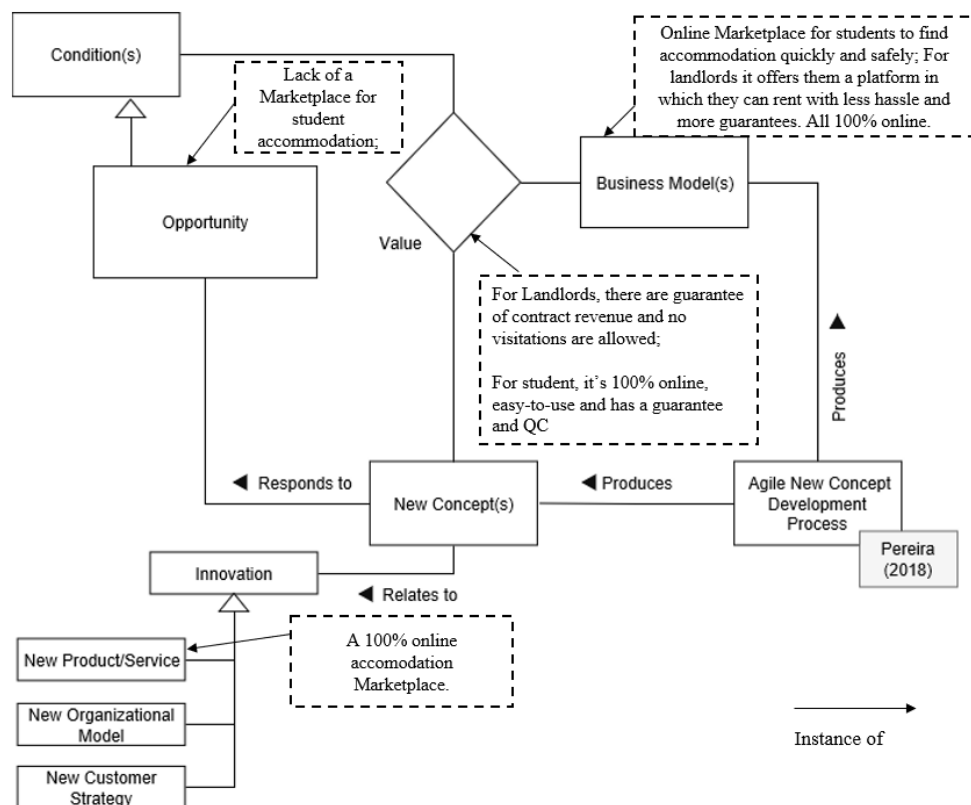


Figure 10 – Scenario I (Uniplaces): The Opportunity Output

### 5.3.2 Scenario II - Swifter by Procter & Gamble

Procter & Gamble is an American company, founded in 1837, which has a wide portfolio of consumer goods. The company has a revenue of over \$60 billion and Operating Incomes of over \$13 billion, as well as a portfolio of over 65 brands, which makes it one of the biggest multi-national consumer goods company in the world.

As West (2014) explains, in 1994 the company was looking to grow through the introduction of new products into their line-up. Craig Wynett, the Director of Corporate New Ventures realized, while watching his wife clean their kitchen at home, that it must “be a better way to clean a floor”. A joint-venture<sup>5</sup> between P&G’s New Ventures group, Continuum (a design firm), and Nothlich Stolley (advertising agency), with the help of experts from P&G’s other departments, united efforts to respond to this new challenge.

Through ethnographic studies and studio analysis of recorded video footage and annotations on the process of cleaning a floor, they found key insights into solving the challenge at hand. They developed a prototype (the FastClean concept) which was then put into the end of users and more than getting the job done, it was surprisingly “fun”. In 1995, after a lot of data gathering and customer studies the company moved on to patenting their solution and found a similar solution already existed. P&G then licensed this technology and developed the product, brand, distribution and readied for the launch of the new Swifter Duster, which happened in 1999.

The Swifter brand is now one of the most successful brands in P&G catalogue with sales of over \$1 billion a year. It was a brand born out of a new business model that builds on P&G’s strengths in technology development, channel management and brand building. Next, the reader may find the output of the development of our 2<sup>nd</sup> Instance for our proposed Model, based on P&G’s Swifter Duster.

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<sup>5</sup>*The Innovation Method Behind Swiffer Madness:* <https://www.fastcompany.com/3006797/innovation-method-behind-swiffer-madness> (accessed in 16/07/2018)

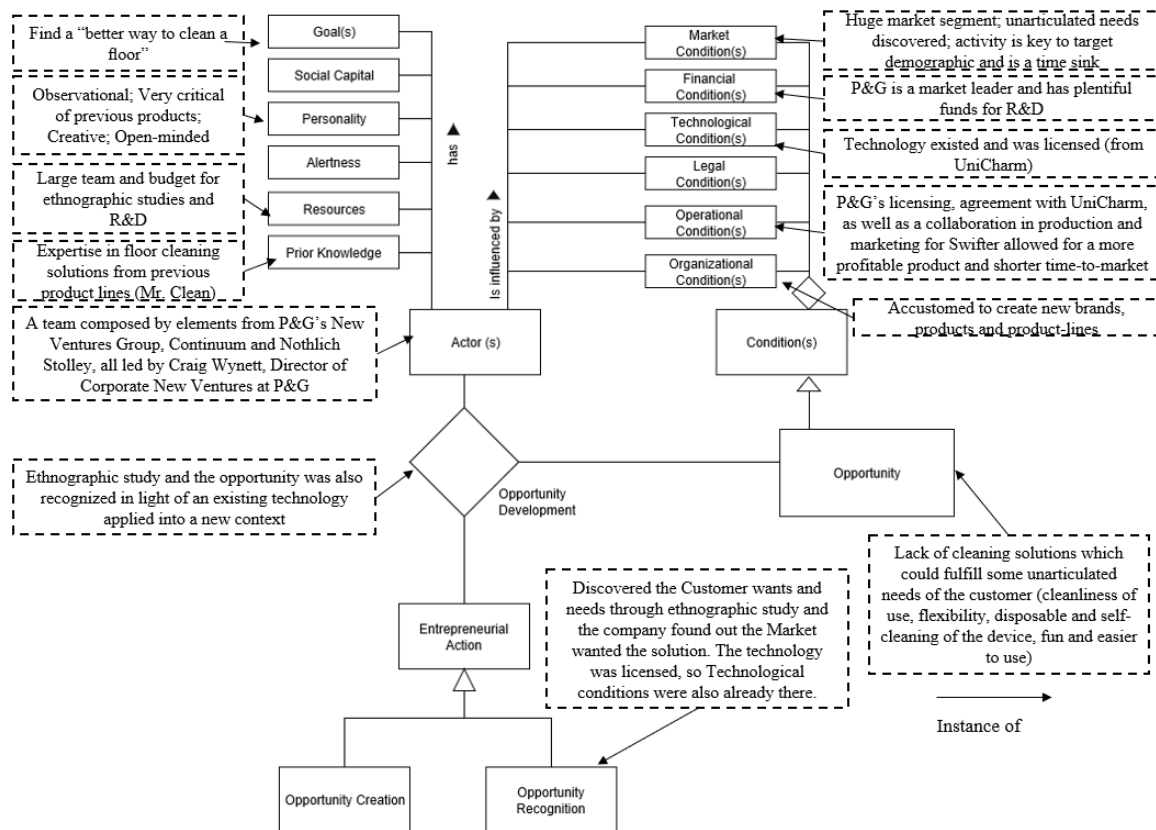


Figure 11 – Scenario II (Procter & Gamble): The Opportunity Development Process

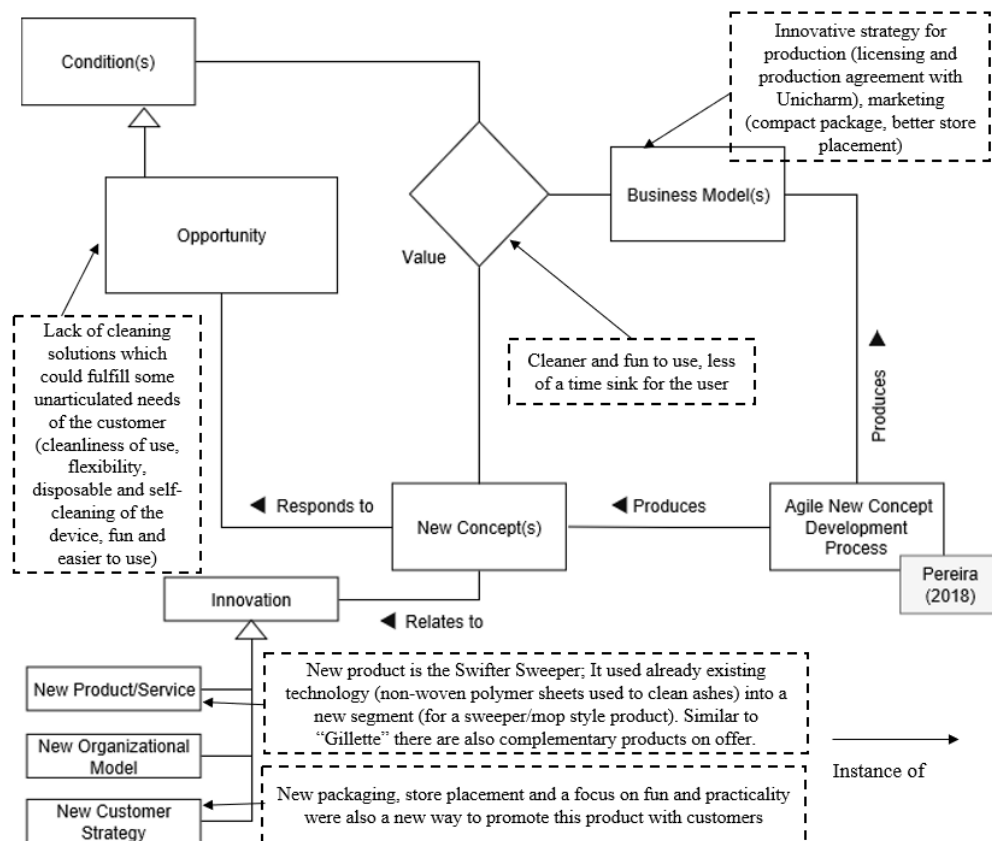


Figure 12 – Scenario II (Procter & Gamble) : The Opportunity Output



## 5.4. Limitations

Our validation process was a two-part process, an interviewing stage to evaluate and refine the proposed model for the explanation of an entrepreneurial opportunity. And, after the closing of this model, a test of its applicability with the development of two instances of the model, based on two success stories.

Obvious limitations arise from this validation process. On one hand, a larger pool of interviewees and with a more preponderant set of entrepreneurs, as well as more variety throughout could have further refined the model and its constructs. On the other hand, this would've taken considerably more time than the scope of this work allowed, even if sample saturation, or when the gathering of new data offers no further insights than the data already collected, per Glaser & Strauss (1967), could be achievable with more interviews.

Additionally, the scenarios and instances built would ideally be validated by someone within the companies (Uniplaces and P&G) who could verify their authenticity, give us alternate takes on the story and even evaluate the model. This was not possible due to the time-frame of this action (which happened later in the timeline of this dissertation) but it would have been a welcome addition to this validation process.

Despite the limitations adjacent to the timeline of this model's development and a late validation process we believe to have enough proof of its usefulness, both as a model capable of mapping out the concept of entrepreneurial opportunity and as a simple and clear representation of the phenomena. This confidence arises from the use of an informed argument approach, which allows for every building block to have support in Literature.

Further validation is needed, especially with entrepreneurs and other stakeholders out of academia, but we believe to have a solid building block for more complex models which can pertain to more specific dimensions of the entrepreneurship nexus or further expansions on this work.

## 6. Conclusions

Since the earliest works on the field of entrepreneurship research, a key question has remained, how can the concept of entrepreneurial opportunity be expressed. The field has grown and interest on the topic has increased, especially after “The Promise of Entrepreneurship Research” (Shane and Venkataraman, 2000) was firstly published. However, there is still some inconsistency on how to classify the phenomenon and what constitutes an entrepreneurial opportunity, with opposing views in Creation theory and Discovery theory.

The proposed model is a response to this challenge and we believe to have achieved a concept of Opportunity that can make the compatibility between both views possible. Additionally, the proposed model also portrays the Opportunity Development process, what outputs can respond to an opportunity and how they come to fruition. In this sense, we have achieved what was set out for, despite a few limitations.

The model was built and validated with interviews and an informed argument approach, to justify each concept and relation. However, the validation process could be more extensive and sample saturation could’ve been achieved had this been possible. Additionally, many of the dimensions in the model while having precedent in literature lack empirical studies to validate a lot of their claims and as Heyner et al. (2004) claims, little behavioural research has focused on evaluating models in the entrepreneurship research area.

Another further development of this model can be achieved on the process of “opportunity evaluation”, which was less developed in the presented model. Another shortcoming to the presented model is the fact that it stops at the boundaries of the Front-End of Innovation, with the outputs (a new solution and a new business model) preceding formal product/service development. Extending further into the new venture creation process could be the next step in modelling the entrepreneurial opportunity.

For future research, another indication from this work is that empirical studies are needed in the field to better understand what factors, human and environmental, are crucial for the success of new ventures and opportunity exploitation.

This work not only used an extensive stock of knowledge from the field, using contrary but complementary views, but it is the belief of its authorship it also has a significant contribution to the field due to its focus on making both views compatible, on explaining the opportunity development process and on connecting the opportunity development with its expected output, in a Front-End of Innovation context.

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Annexes

Annex I: The Model for the Entrepreneurial Opportunity

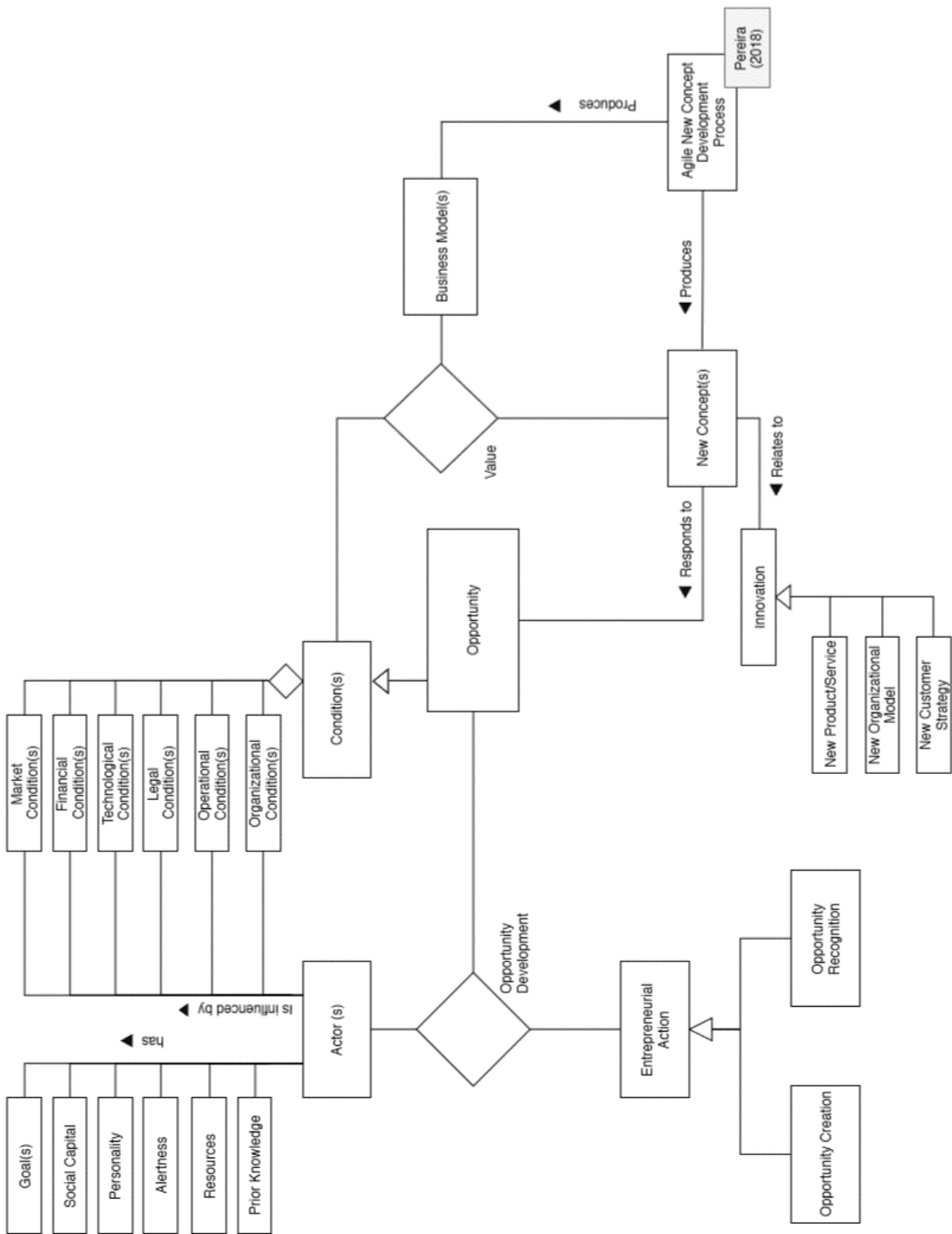


Figure 13 - The proposed Entrepreneurial Opportunity Model

## Annex II: Glossary of Terms

Table 11 - Glossary of Terms for the EO Model

Concept	Explanation	Contributions
<i>Opportunity Development Component</i>		
Actor (s)	The individual, the entrepreneur or entrepreneur to be which is influenced by several key prominent factors which make him more apt than others in recognizing opportunities (either through a Discovery Process or Creative one).	George et al. (2014) and Baron (2006)
Prior Knowledge	A stock of information which makes some individuals more capable of recognizing opportunities than others. A lack of knowledge, skills and experience hinders the process of opportunity recognition.	Shane and Venkataraman (2000) Kourilsky and Esfandiari (1997)
Resources	Assets, intangible or tangible, the actor (company or entrepreneur/s) has available to use in the venture.  These resources can be financial or equipment, for example, or more intangible such as organizational routines, IP, among many others.	Haynie (2009)
Alertness	Introduced by Kirzner (1973), this attribute is the entrepreneur's ability to see situations from a new perspective more frequently than someone with a lower alertness. This is influenced both by his personality but also from his active efforts, the search for these opportunities, classified as Systematic Search (George et al., 2014).	Kirzner (1973); George et al. (2014); Gaglio and Katz (2001);
Personality	From the study by George et al (2014), some attributes of the individual can facilitate the creation of new firms, these are creativity, self-efficacy, the propensity to assume risks, the need for achievement, the need for independence, and the need of control. These were found by previous authors and we can understand them as a key component of the entrepreneur's personality and way of thinking.  Existing support in literature is shorter than other characteristics and some controversy remains on the influence of these traits on the entrepreneurial process.	Baron (2006); George et al. (2014)
Social Capital	Social Capital is a set of social relations (people) which can be expected to provide support and resources, by virtue of the actor's membership to a certain social network. These scarce resources accessed by the entrepreneur help recognize and explore opportunities (Fuentes et al.,2010)	Boxman et al. (1991); Portes (1998); Fuentes et al. (2010);
Goal(s)	The set of goals of the entrepreneur or the team has, composed by His/her vision for his/her own professional future and future ventures. An instance of these goals can be a "New Venture Idea" (Davidsson, 2015). Shane (2003) points to the importance of motivational factors in explaining entrepreneurial action, to which we believe Goals can be a crucial element (in conjunction with personality traits)	Davidsson (2015), Shane (2003)

Table 11 - Glossary of Terms for the EO Model

Condition(s)	The Internal/External entrepreneurial environment represented by a set of one, or more, conditions, A subset of these conditions represents the opportunity, either because these are created by the entrepreneur (technological conditions can be changed due to a R&D Project), or because these help the entrepreneur discover the opportunity it will act upon.	Authors
Opportunity Development	<p>The process of an individual developing the opportunity, either through the creation of new conditions or the discovery of new factors which play into the opportunity, both alternatives sources of opportunity. This process also depends on the entrepreneur (the Actor) and his own characteristics and influencing factors, as well as the nature of the opportunity at hand.</p> <p>Opportunities are developed throughout the new venture process, continuously, since the early perceptions of the opportunity are always rudimentary (Sanz-Velasco, 2006).</p>	Sanz-Velasco (2006)
Entrepreneurial Action	Entrepreneurial action is defined as any activity entrepreneurs might take to form and exploit opportunities.	Alvarez and Barney, 2007).
Opportunity creation	This process is the process of opportunity formation/exploitation under the "creation theory". In this theory, opportunities are not assumed to be objective phenomena formed by exogenous shocks to an industry or market. Rather, they are created, endogenously, by the actions, reactions, and enactment of entrepreneurs exploring ways to produce new products or services.	Alvarez and Barney, 2007). (with contributions from other authors)
Opportunity Recognition	The process of identifying an existing opportunity and recognizing it has value. Under the Discovery theory an opportunity exists independent of the entrepreneur and his task is to identify it, recognize its value and exploit it. Several explanations can be found for the information asymmetry which lead certain entrepreneurs to discover opportunities others cannot (information corridors; cognition properties for example)	Shane and Venkataraman (2000)
Opportunity	A set of conditions which allows for the viable introduction of an innovation, in the form of new products or services, new organizational models, or new customer strategies, in the market.	Authors
<i>Opportunity Output Component</i>		
Business Model(s)	The Business Model is a strategy for companies to transmit how they will conduct business, capture and deliver value and engage with customers and other stakeholders. Can be communicated in different manners, some more formal and others more casual (ex: the Business Model Canvas, the Business Plan).	Magretta (2002); Zott et al. (2013); Osterwalder and Pigneur (2010);
Value	<p>Value, from an economics-centric perspective, is the worth a customer attributes to the usage of a good or service. In classic economic theory, this worth is proportional to the importance a need serves.</p> <p>However, value can be seen from two perspectives, an internal perspective (where it equates profit) and an external one, which equates customer satisfaction. The latter is the definition of value used in this diagram and the one useful for our study.</p>	Hassan (2012); Martinez (2004)

*Table 11 - Glossary of Terms for the EO Model*


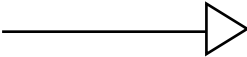
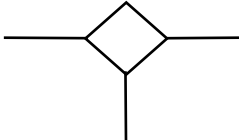
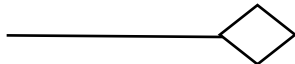
New concept(s)	In this sense new concepts are the entrepreneur's response to the market need, these can be goods, services, processes or materials depending on the market need and its respective market. These new concepts can be seen as the new means-ends relationships Shane and Venkataraman refer to when discussing the exploitation of opportunities as the result of entrepreneurial action.	Shane and Venkataraman (2000)
[an] Innovation	<p>An Innovation can be thought of as the set of "new products, business processes and organic changes that create wealth or social welfare", according to the OECD. In this sense, an Innovation can be any new business model, product, technology or other forms of change which can create value in the market.</p> <p>Several forms of Innovation exist, although we used Keeley's "Ten Types of Innovation" as a basis to find three types of Innovation, composed by aggregates of specific types of Innovation.</p>	Vaitheeswaran (2007); Keeley et al. (2013); OECD (2005)
Agile New Concept Development	Process of development of a new envisioned solution for the market which creates a New Concept and precedes formal Product/Service Development.	Pereira (2018)

## Annex III: Unified Modelling Language elements of the EO Model

As noted in the Methodology section, this model was developed with Unified Modelling Language as a basis for expressing the relations between separate concept and phenomena. To put it simply, Unified Modelling Language, as a set of diagram types and ways to express concepts and their relation, allows for an easier understanding of the model at hand and an enumeration of these relations with a common set of visual elements.

To this end, we express four types of relations in our Models, presented in the next table for the reader to familiarize itself with them:

Table 12 - UML Language used in Detail

Visual Element	Type of Relation between concepts	Further explanation
	Association	Connects two concepts. Most elementary form of relationship, used throughout and explained through identifiers for the relationship between object (Produces, Relates to, etc.)
	Generalization	The concept on the standard side of the line (in contrast with the “arrow”) is an example/form of the concept expressed on the “arrow” side of this element.
	Multiple Association	A binary, tertiary or quaternary association connects different elements. The term expressed in the diamond square expresses an association between all the elements connected with this element
	Aggregation	This type of relation between concepts expresses a “whole” and parts relation. This element connects at one end (the clear white diamond end) the “whole” and at the other parts which are components of the main concept (“are part of”).